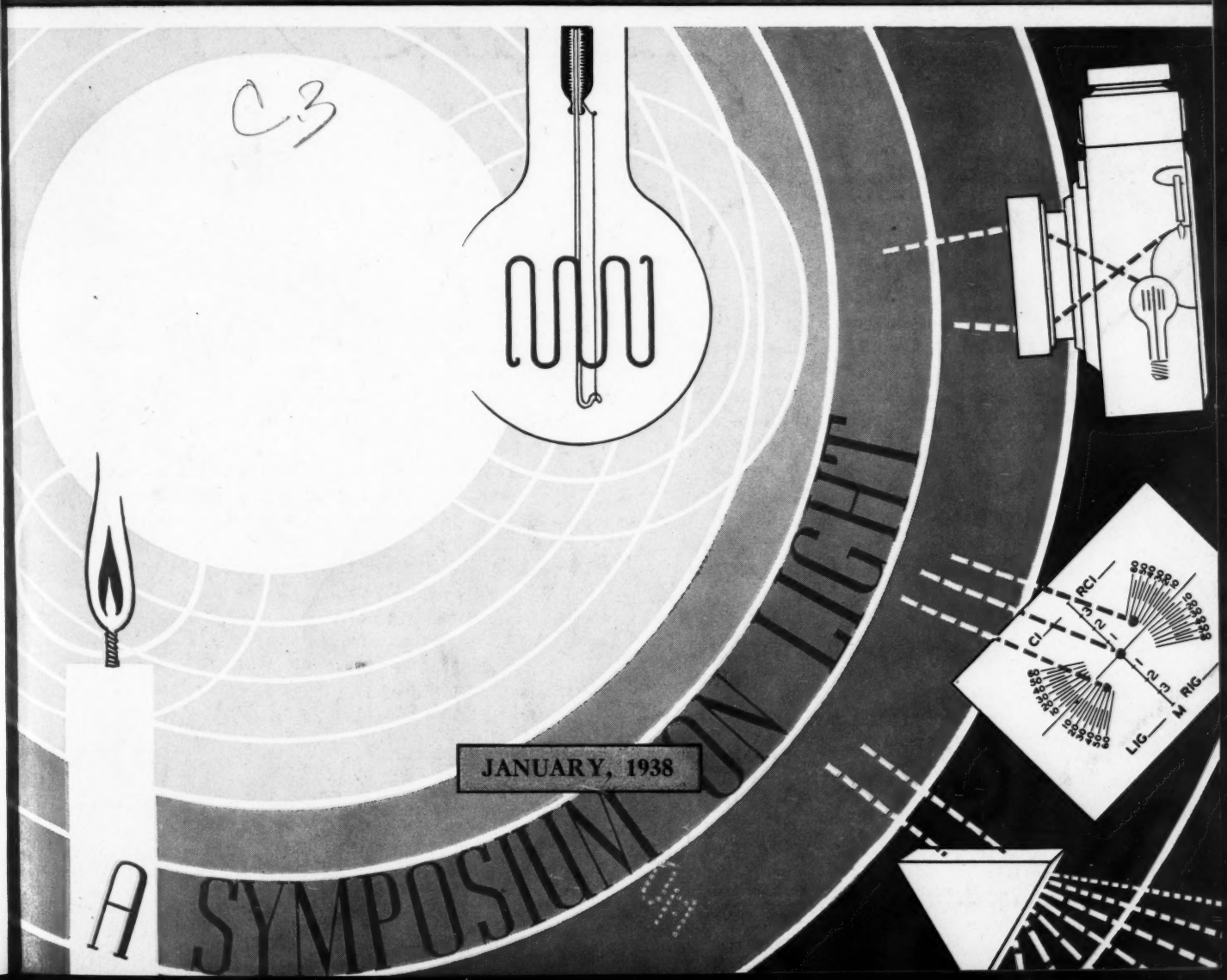
THE DENTAL DIGEST



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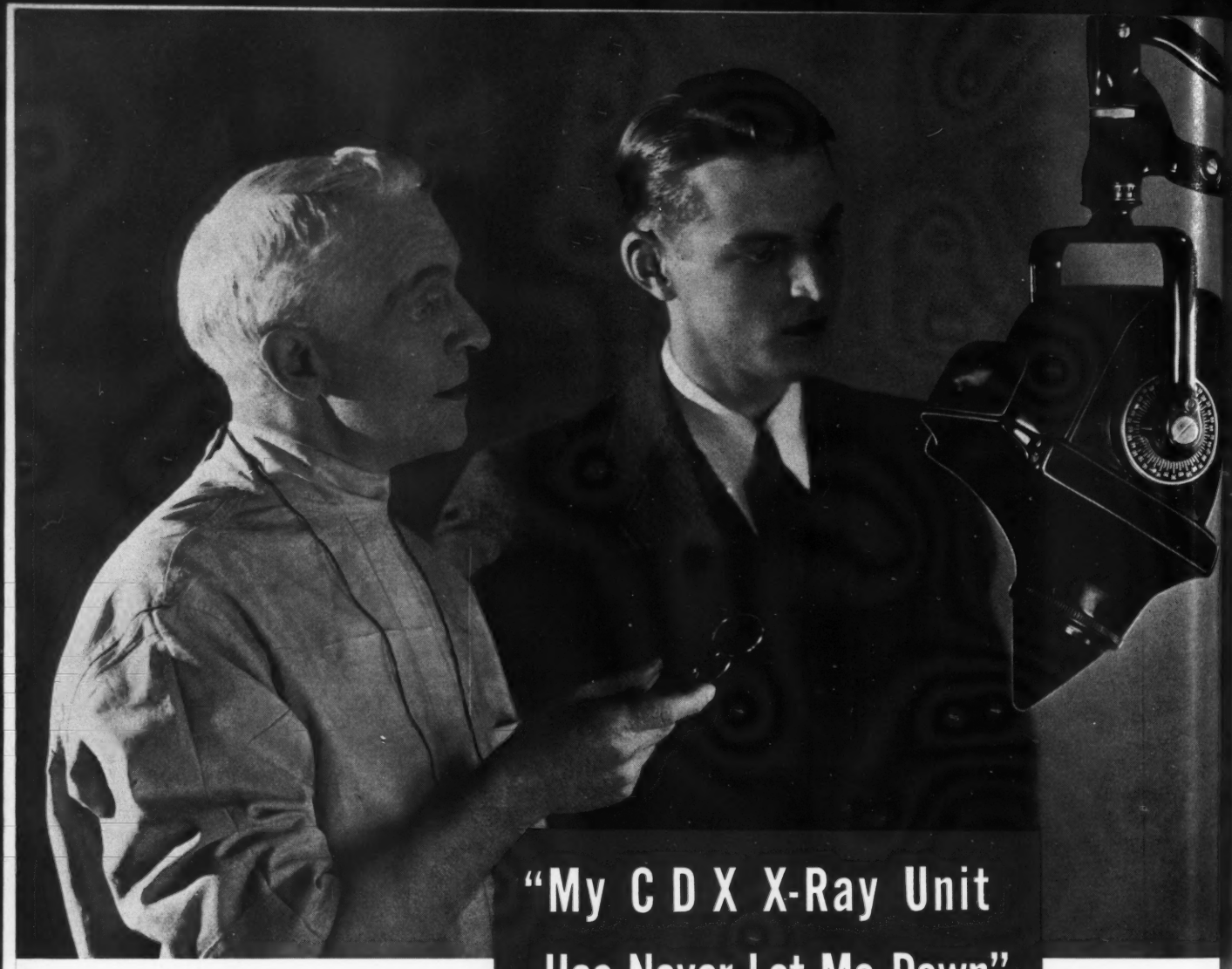

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About Our CONTRIBUTORS

JAMES S. MILLER received his D.D.S. in 1905 from the Pennsylvania College of Dental Surgery. Doctor Miller is a member of the American Dental Association and New Jersey component societies. He is engaged in general practice. Doctor Miller's present article is one of a symposium of three articles on light in this issue, the Mendelsohn and Fischer articles completing the symposium.

•

WILLIAM ARTHUR MENDELSOHN has written numerous articles on light as related to the eyes and for the purpose of charting and interpreting visual color fields, particularly for patient education purposes. He is a member of the Illuminating Engineering Society.

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M. MARTYN KAFKA (B.S., University of Arkansas; M.D., University of Maryland Medical School) has contributed numerous articles to the LARYNGOSCOPE, and to other publications, primarily medical, and is at present writing a textbook on Ear, Nose, and Throat. Doctor Kafka is a member of the American Medical Association and component societies; Otorhinolaryngology society, and faculty member for four years of New York University Medical School. Doctor Kafka's practice is limited to the treatment of Eye, Ear, Nose, and Throat disorders.

THE DENTAL DIGEST

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SEE PAGE 43 FOR SUBSCRIPTION DATA, ETC.

An Optical System for the Registration of Mandibular Movements by Means of Light*

JAMES S. MILLER, D.D.S., Trenton, New Jersey

DOES THE PRESENT method of registration permit of such a degree of complication that only 5 per cent of the profession elect to follow the principle of anatomic articulation whereas 95 per cent employ plane line articulators? The attempt at a solution of this problem has led me to investigate the possibilities of a new agency for registration; this agency is light.

In my hands the present anatomic articulators were found acceptable, but the method of registration was not altogether satisfactory. It occurred to me that light offered a highly sensitive and exact means to visualize, measure, magnify, and reproduce mandibular movements as found in each individual case. Photography and multiple mirrors were used at first, but it was found that whereas they had certain advantages for research purposes, they were not usually necessary; therefore, the mechanism was reduced to a form in which direct light is used.

The principle involved in the method and apparatus used is simple, and is familiar to every youngster who holds a flashlight against a wall. When he moves the flash light, the light on the wall moves, and when he holds the flash light still, the light on the wall is stationary. The movements and positions of the flash light determine the movements and locations of the light on the wall. In a similar way the movements and positions of the mandible can be determined by attaching a light to the lower bite block and observing the movements and positions of the mandible on the screen which is attached to the upper bite block. In its simplest form the mechanism may include a small light and a glass screen.

H. Gordon Garbedian in his review[1] of the book, "The Universe of Light" by Sir William Bragg, says:

What is light? This question involves the most baffling problems of modern science. The immortal discoverer of the correct answer of this enigma may give us the whole story of creation. Light enables us to distinguish the beauties of our gardens, helps the physician on the trail of disease to penetrate to the inmost parts of our bodies, and gives to the astronomer the power to explain some of the cosmic laws governing stars at the utmost boundaries of gloomy space. We know much of the properties and uses of light, but scientists eager to understand the essence of this celestial phenomenon have succeeded only in advancing contradictory theories which have added to the confusion of present day physics. The controversy over

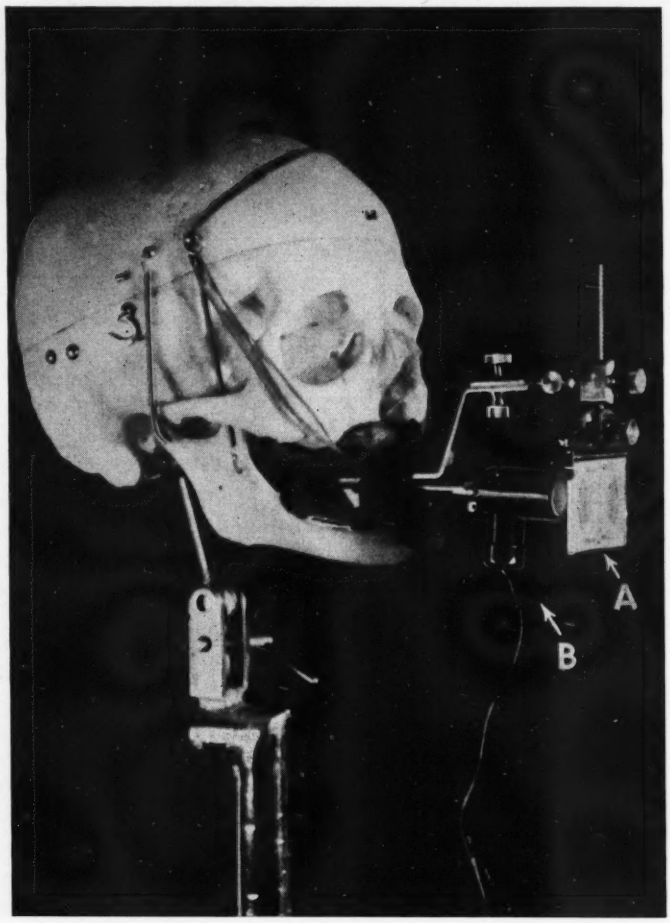


Fig. 1—A, Glass screen and supports attached to upper bite block; B, Light attached to lower bite block.

*Read before The National Society of Denture Prosthetists, July 7, 1937.

[1]New York Times Book Review, August 20, 1933.

Fig. 2—A, Screen with the horizontal and vertical lines.

Fig. 2—B, Light with a metal disc and the three minute openings through which the rays of light pass.

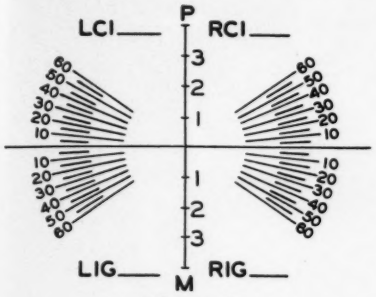


Diagram 2

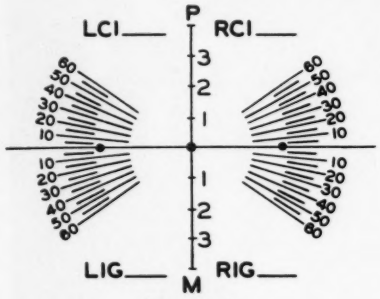


Diagram 3

Fig. 3—The three lights on horizontal line with center light at junction of horizontal and vertical line indicate centric occlusion.

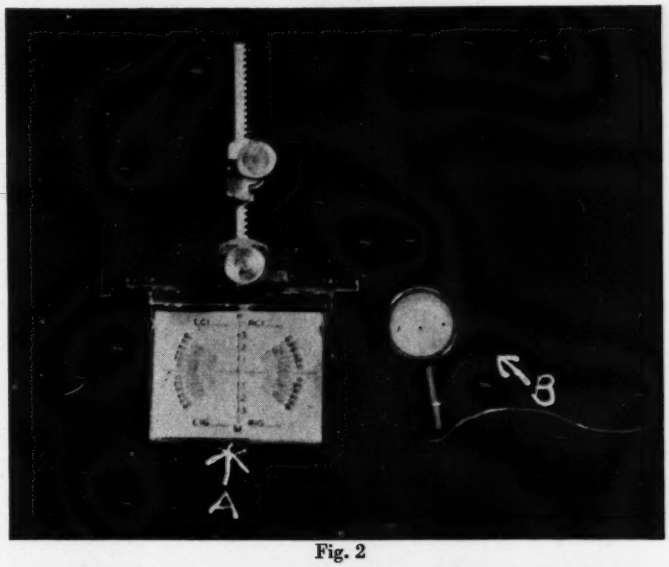


Fig. 2

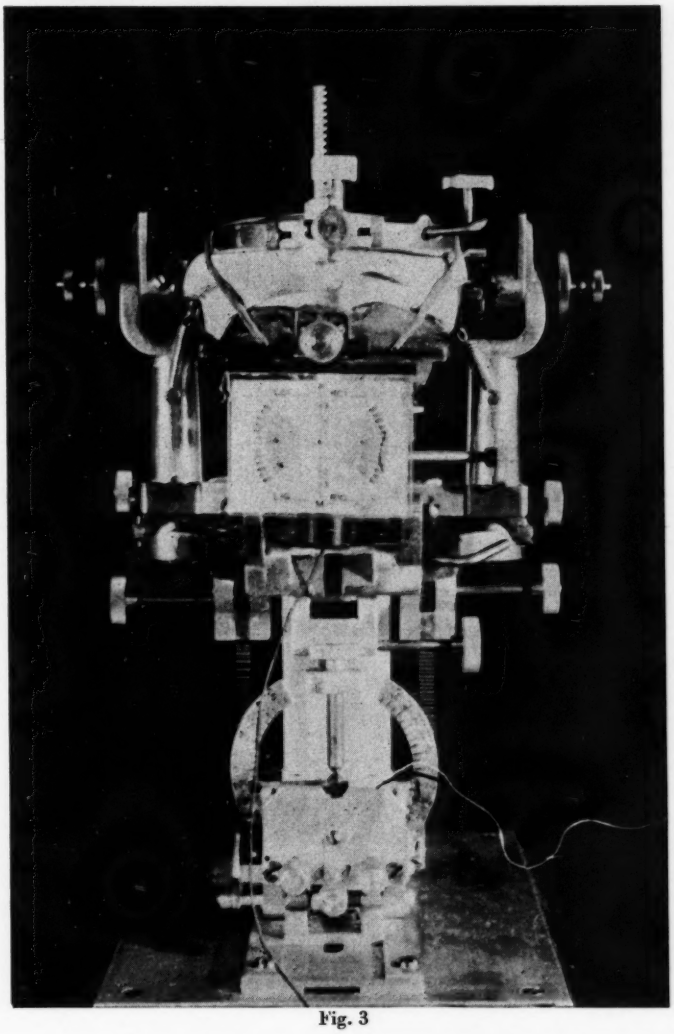


Fig. 3

the nature of light has been going on for more than three hundred years. Newton thought of radiation as a stream of particles thrown out from a luminous source, like bullets from a machine gun; then came Huygens, the exponent of the view that light consists of waves and the corpuscular theory was doomed. Recent experiments, particularly those of Professor Arthur H. Compton, Nobel Prize physicist of the University of Chicago, have proved that radiation has a dual nature, that it is both particle, as Newton maintained, and a wave, as Huygens argued. Light has a Jekyll-Hyde character. It wears a different aspect, a different face at different times, but only one aspect at any one given moment.

To all the other uses of light in the dental profession, that of mandibular registration may now be added. It is certain that research in the physiology of the temporomaxilliary articulation by means of light will assist us to better denture construction.

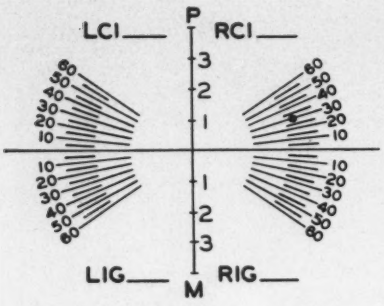


Diagram 4

Fig. 4—Three lights on screen above horizontal line, and center light on the 30° line indicate an inclination of 30° on right side.

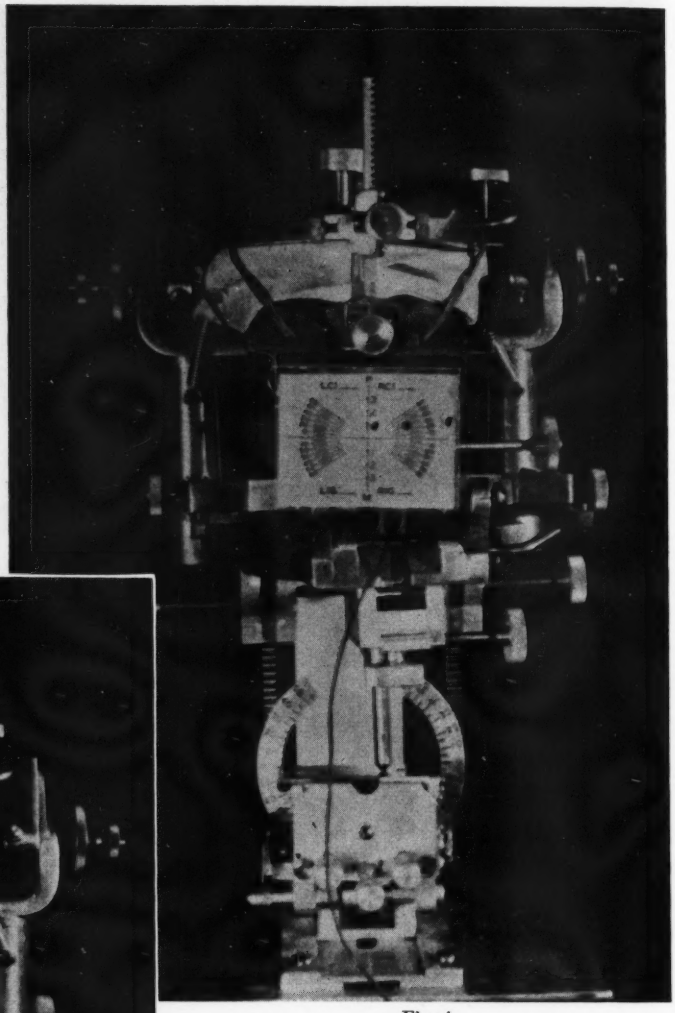


Fig. 4

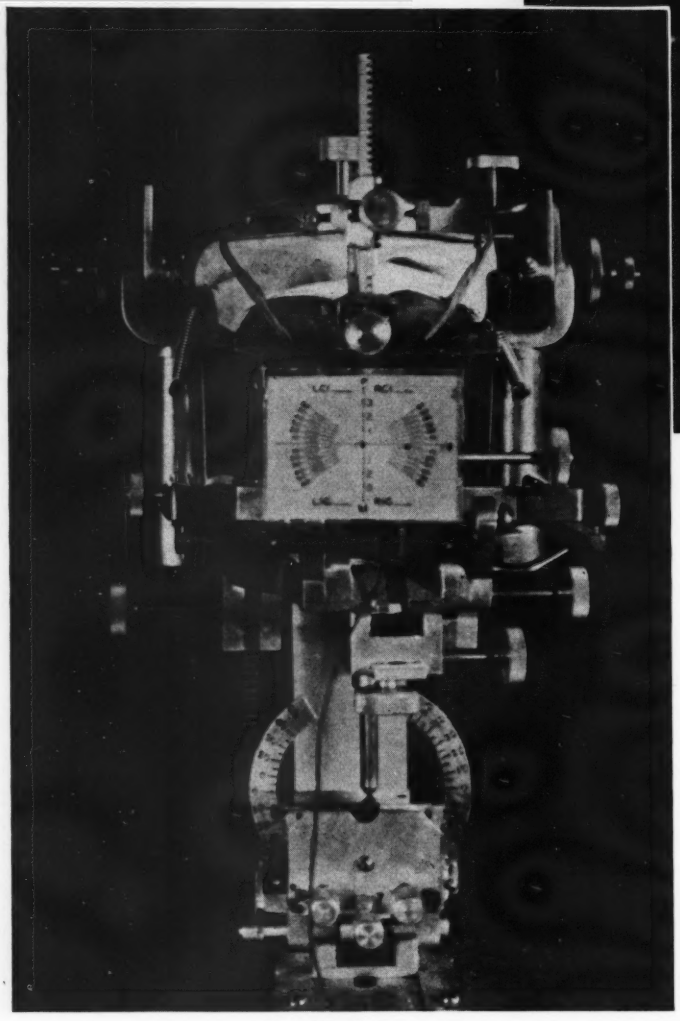


Fig. 5

Fig. 5—Three lights below horizontal line, with center light on the 10° line indicate minus 10° on the right side.

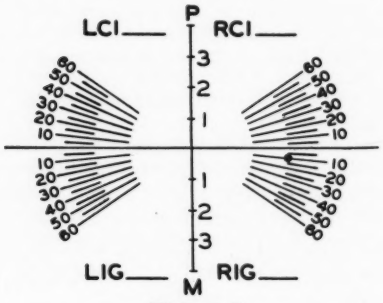


Diagram 5

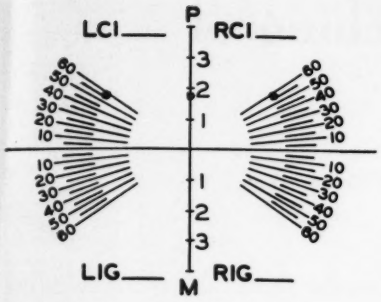


Diagram 6

Fig. 6—Three lights above horizontal line, with center light on vertical line indicate protrusion.

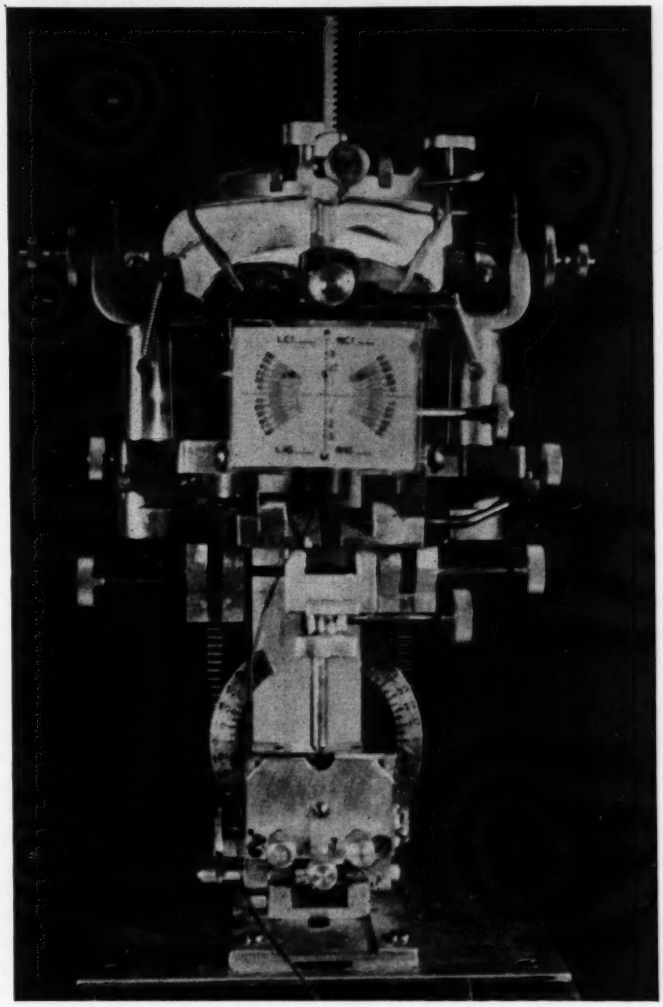


Fig. 6

Armamentarium

The armamentarium to register mandibular movements by means of light consists of a glass screen attached to the upper bite block, and a light attached to the lower bite block, as shown in Fig. 1.

The screen is adapted to the Gysi articulator and the graduations on the screen are in harmony with those of the sagittal condyle path degree plates of the articulator. It will be noted that the screen is divided in the center by two lines, one horizontal and one vertical. This provides a right and left field as well as an upper and lower field as shown in Diagram 2. Any other anatomic articulator can be used with this method, provided a screen is adapted to the particular instrument.

Technique

The light is enclosed in a small tube and covered anteriorly by a small metal disc in which there are three-minute openings, as shown in Fig. 2, B. The rays of light, leaving their source, pass through the minute openings in the metal disc and come to their destination on the screen, visible to the eye as three dots. When the upper bite block to which the screen is attached and the lower bite block, to which the light is attached, are introduced into a patient's mouth, the dots are centered on the horizontal line of the screen. The center light from which we take our readings is at the junction of the horizontal and vertical lines as shown in Fig. 3. The patient is instructed to open and close the mouth. As this is done the three lights move on the screen. The mandible is then moved from centric occlusion to protrusion until we are certain that the head of the condyle is in the most retruded position in the glenoid fossa, and the three lights on the screen are on the horizontal line with the center light at the junction of the vertical and horizontal lines. We are then positive that we have centric occlusion. We then ask the patient to move the mandible from right to left. If the center light on the screen moves to the left, above the horizontal line, we take the reading on the screen at whatever degree the center light falls. In Fig. 4 the center light is on the left side of the screen on the thirty degree angle, indicating a thirty degree inclination of the right side of the mandible. (This also applies to the left condyle.)

If the patient moves the mandible from right to left and the three lights move below the horizontal line on the left side of the screen, as shown in Fig. 5, the center light indicates a minus ten degrees on the right side of the mandible. If the three lights move above the horizontal line and the center light is close to or on the vertical line, as indicated in Fig. 6, the mandible is in protrusion. A flat condyle is indicated when the center light remains fixed while the side lights converge. (In more than one

(*Continued on page* 14)

Light as Related to Matching of Shades of Teeth

WILLIAM ARTHUR MENDELSOHN, Chicago

OBJECTIVELY, LIGHT MAY be described as a physical force which on stimulation of the retina results in the sensation of vision. The manifestation of the sensation may be divided into (1) visibility of objects and (2) color.

To describe or define color is beyond the possibilities of this article and even a treatise of book length could hardly do so positively, because there is so much yet to be known about color and about how we see the color. It may be stated, however, that color is a quality of bodies, other than form, and is more strictly a property of light itself rather than the bodies, because our perception of color is dependent on the vibrations or wave lengths of the light reflected by the body. In absolute darkness nothing has color, but merely the property to reflect certain wave lengths or combinations of wave lengths of light.

It is accepted that that color which we attribute by name to a certain visual sensation as being the color of an object is dependent on two factors: (1) the pigment or pigments in the object itself, and (2) the character of the light by which we see the object and its color.

There are three primary descriptive factors related to color. Two of these, namely, hue and purity, or saturation, can be explained; the third, luminosity or brightness, is such that scientists "tread softly" in attempting its definition. Hue is the definite color sensation produced, such as red, blue, yellow. Purity, or saturation, indicates the singleness of the wave length that falls on the retina, such as a pure green or pure red. Mixture with any other wave length affects the purity of the color sensation; for instance, an object which under a truly balanced spectrum of white light is green, when seen under a light that is preponderantly yellow, will not appear as a pure green, but as a green-yellow mixture, because the yellow wave length of the light will counteract the green pigment element of the object. Luminosity is a peculiar element of color. No definite explanation of this factor can be given.

Light As It Relates to Matching of Shades of Teeth

Natural teeth possess an element of pigment which is responsible for the variations of shades. Interpretation of these shades is based on two factors: the pigment matter in the teeth which reflects light, and the light by which we see the teeth. The first factor, the pigment, is for our purpose, a nonvariable; but the second factor, the light by which we see, is a decidedly variable factor and should be given serious consideration.

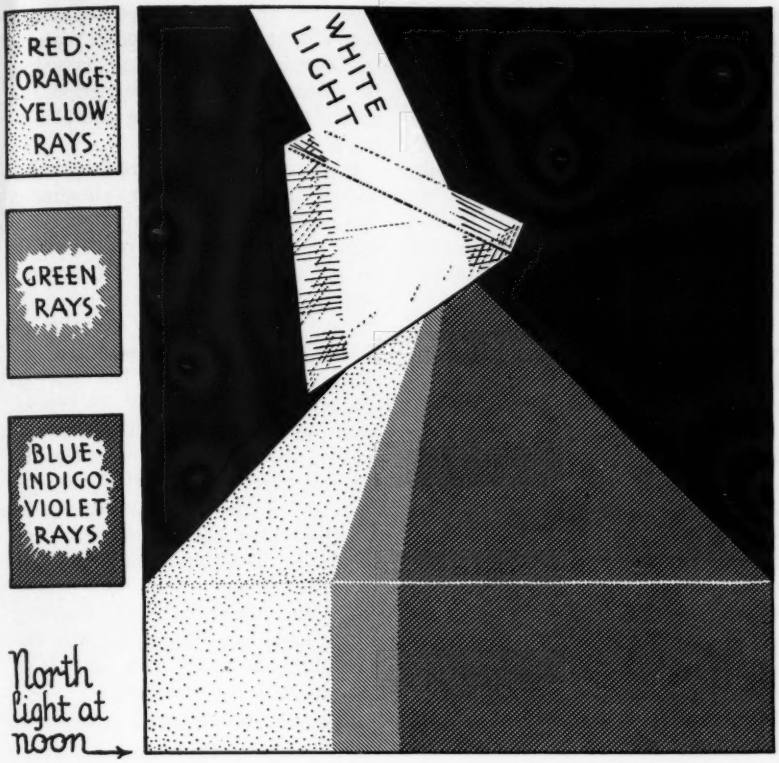
Inasmuch as the purity of a color is dependent on the purity of the light by which we see that color, it is important that the light used during the process of matching be of such a balance that it will neither add to nor detract from the true value of the tooth shade.

The standard of judgment of colors is supposedly based on that which is termed pure white light. White light may be said to be composed of equal portions or bands of light waves ranging from the red to the violet. These bands may be described from a visual sense as being red, orange, yellow, green, blue, indigo, and violet. If equal bands of these wave lengths exist in a light, the result will be pure white light.

Light from the direct sun is well known to be rich in the red-orange end of the spectrum, as can be testified by our color judgment and the sensation of heat. Such light would hardly be sufficiently neutral for shade matching. Light from the north sky at noon and within an hour or two before and after noon on average bright days is, on the other hand, well balanced spectrally. This is due to the absorption of the excessive reds and oranges by the excessive blue of the sky. This spectral balance, however, is not stationary. It varies with zones and with seasons of the year, as well as with atmospheric conditions. For that reason we cannot depend on Nature to supply us with light of balanced spectral character on which to depend for the matching of tooth shades. The light under which shades of teeth are matched must be arranged spectrally in such a manner that the same balance can be obtained in the laboratory and at the chair if one is to depend on visual judgment.

My personal observations in dental offices have convinced me that few dentists have an overhead lighting system that is sufficiently neutral for matching tooth shades. Raw light (that is, light from ordinary electric lighting units) is always rich in reds and yellows. The raw light, therefore, will add those mixtures to the natural shade of the teeth under judgment. It may even act completely to neutralize certain shade values of the teeth. A tooth may have a blue hue, for example, owing to the pigment. If a light rich in yellow is used for discernment, the retinal stimulations of the blue are completely neutralized by the yellow of the light and the resultant sensation is white with no recognition whatever of the blue pigment of the tooth. It is an established physiologic fact that complementary colors (light waves) will neutralize the sensation of each other and the result is nonrecognition of either color. Thus, blue and yellow are complimentary, as are green and red.

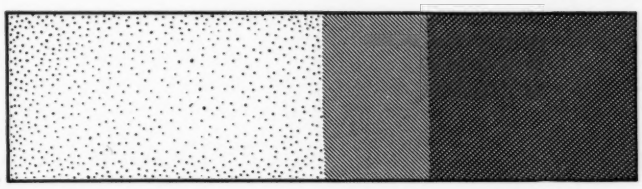
It might be argued that if the matching is done under ordinary electric lighting the color values will be maintained when seen under similar conditions. This is true if the lighting is always the same. But, the



Color is a quality of objects but is more strictly speaking a property of the light by which we see the object

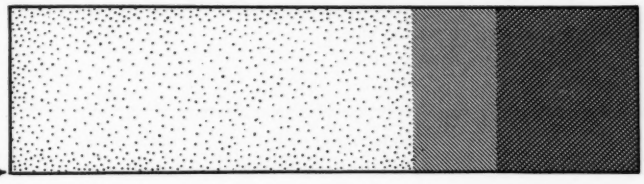
North light at noon →

North sky light is reflected light. The sun's rays are reflected from the sky; thus the excessive reds and yellows are absorbed by the atmosphere and the blue of the sky. North sky light at noon is usually well balanced.



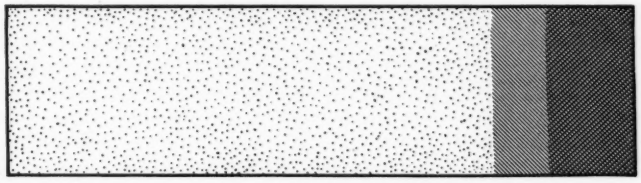
West light at noon →

West light at noon is reflected light, but a considerable portion is almost direct from the sun; thus it contains a high proportion of red and yellow.



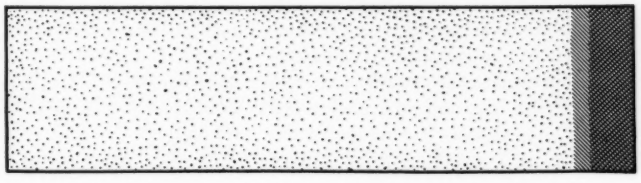
West light early afternoon →

West light during the afternoon is almost entirely direct from the sun. The direct light from the sun is, of course, rich in the red end of the spectrum.



West light late afternoon →

West light late in the afternoon is direct light from the sun and is preponderantly red because the blue end of the spectrum is refracted first below the horizon.



Ordinary electric light →

Ordinary electric light is rich in the red-yellow end of the spectrum because more than 90 per cent of the energy is dissipated in heat.

ordinary lighting arrangements in offices do not coincide with the lighting arrangements in a patient's home or with outdoor conditions. On the other hand, when the matching is done under absolutely neutral conditions, nothing has been added to or detracted from the true color value, and thus teeth take on the shade dependent on the lighting under which they are seen. Tooth shades, if matched under a light rich in red-yellow and then seen under a light far less rich in these colors, will appear redder or yellower than they should be.

For ideal conditions, the same precautions should be taken by the dentist as are taken by chemical companies who match colors of pigments such as inks and dyes. They use a lighting unit that has a spectrum correctly and scientifically balanced so that the emanating light is as pure white as artificial lighting can produce.

It is even wise to exclude the variable daylight when teeth are to be matched. The overhead lighting should be turned out to prevent the alteration in color value that such lighting may effect. During the process of matching, lighting should be used only from a source that has been especially constructed to emit a truly balanced spectrum of white light. No values will then be added to or detracted from the natural tooth shade, and perfect blending and matching can be accomplished.

It is wise, if the matching is to be done during the day and the shades are lowered and overhead lights diminished, to wait for three or four minutes until the eyes become adapted to the lower light intensities. Eyes become considerably more sensitive in lower levels of illumination once they become adapted to the dark. This period of adaptation will make for greater perfection in the matching and blending of shades. This does not mean that working under such conditions is preferable to working under good light of good intensity. The intensity must be foregone, however, for the purpose of obtaining better light balance for color matching. Dentists will not mind foregoing the intense light as the period required for such matching and blending is short.

It must be remembered that so-called "daylight bulbs" or blue screens will not accomplish a balanced spectrum of light. The light from "daylight bulbs" is preponderantly red and red-yellow. The light must be correctly filtered, and reflected by selection, so that when spectrally measured the spectrum approximates the light of the north sky at midday. To repeat, color sensations are dependent not only on the pigment value of the object but also on the spectral value of the light. A spectral balance can be procured if the lighting unit has been originally designed to produce such spectral balance. Once the dentist does his matching and blending under ideal conditions, he will immediately recognize why light is so important to the problem.

Edgewater Beach Hotel.

AN OPTICAL SYSTEM FOR THE REGISTRATION OF MANDIBULAR MOVEMENTS BY MEANS OF LIGHT

(*Continued from page* 11)

hundred cases of registration of mandibular movements by means of light, I have not seen one case in which the center light remains fixed.) When retrusion exists, the two side lights will diverge.

A record of the angles of the registration is made on the patient's examination card. The sagittal condyle path degree plates on the articulator are set accordingly, and the incisive guide is adjusted in harmony with the inclinations as shown on the accompanying table.

Incisive Guide Adjusted to Inclinations

CONDYLE INCLINATION	SCREEN	INCISIVE GUIDE
5	5	5
10	10	9
15	15	10
20	20	13
25	25	15
30	30	16
35	35	17
40	40	18
45	45	19
50	50	20
55	55	20
60	60	20

If the movements and positions of the lights on the screen are interpreted correctly, the whole story of the movements and positions of the head of the condyle in the glenoid fossa will be understood. The physiology of the temporomaxillary articulation is presented for observation and study. These movements and positions of the dots on the screen, coming to us as they do from a ray of light and being graphic, make us confident of its accuracy. Registration of condyle inclination by means of light results in occlusion for balance and efficiency.

105 *West State Street.*

Light and the Camera

HENRY FISCHER, D.D.S., Bronx, New York City

THE SCIENCE OF writing with light is the literal translation of the word "photography." Photography is nothing more than a study in the reactions of light. If we can understand how to control the quality and the quantity of the light which is cast on the object and which is reflected into the camera, then our results will be good.

The equipment for photography, such as the lens, the shutter, the film, the developing solution, the fixing solution, the printing and the enlarging requirements—all these have been standardized. The only variable is the light. Light will be discussed under two headings: first, the sources of light; second, the method by which the camera controls the amount of light it allows to pass through it.

Sources of Light

The sources of light may be the sun or artificial lamps such as photoflood or photoflash bulbs. Natural light varies at different times of the day. Artificial light is more constant if the same bulbs are used at the same distance; however, the bulbs become weaker the longer they are in use.

The character of the light, whether natural or artificial, may be measured by a photo-electric cell which generates a stronger current in a brighter light, so that a needle indicator shows a higher reading. The camera is set according to the intensity of the light.

How Camera Controls Light

On the camera there is a shutter with different speeds, and a lens with different diaphragm openings. The wider the lens opening, the more light will enter the camera. The slower the speed of the shutter, the more light will enter the camera. These two variables are functions of each other and are expressed in these terms: the speed in fractions of a second; for example, ½, 1/25, 1/100, 1/500; the diaphragm openings, in the better cameras are designated, for example, by f:45, f:16, f:6.3, f:4.5, f:3.5. The "f" value of a lens opening is a number that expresses the relationship between the diaphragm opening and the focal distance of the lens, and has the same relationship in all cameras.

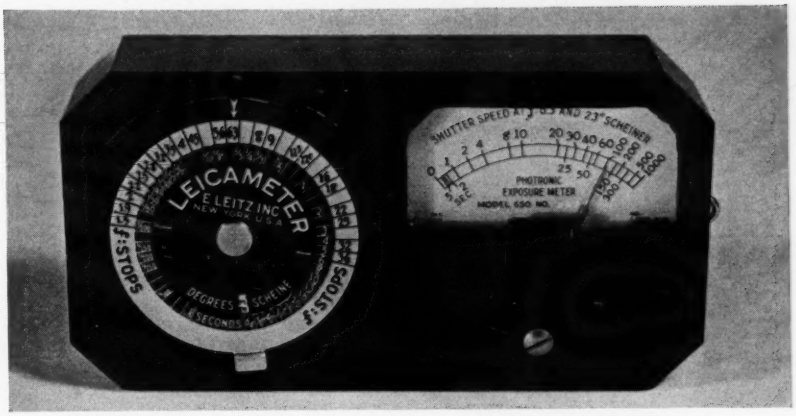


Fig. 1—A typical photo-electric cell used to measure the intensity of light.

If the lens opening is small as in a pin-hole camera, the simplest of all cameras, only the brightest of light, sunlight, will secure a picture. As soon as there is less light, the only way the image can be secured is by lengthening the exposure time. But as the time is increased, there is more chance of movement in the pictures which is undesirable in the use of a still camera.

Interdependent Factors

1. *Lens Opening*—The larger the opening of the lens, the more light enters the camera. The value of the camera depends on the lens opening. The more lens power there is, the more expensive the camera.

2. *Shutter Speed*—The slower the

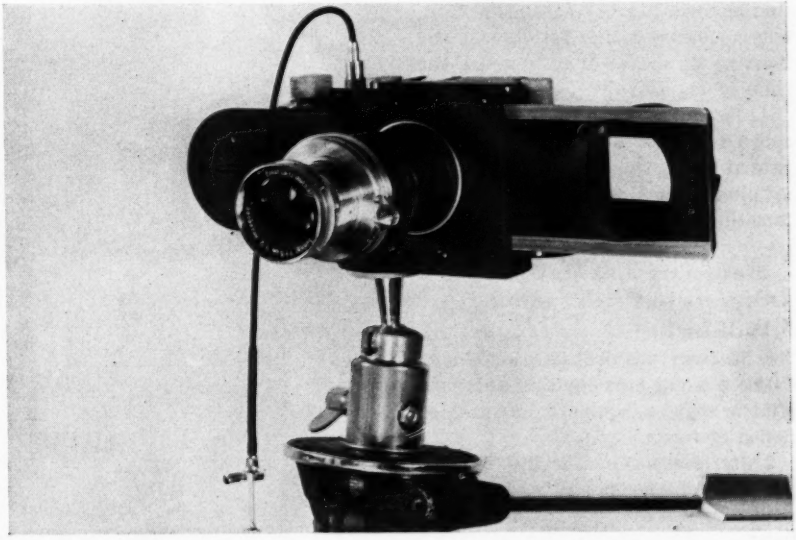


Fig. 2—A single exposure camera which consists primarily of a lens and a sliding ground glass focusing attachment.

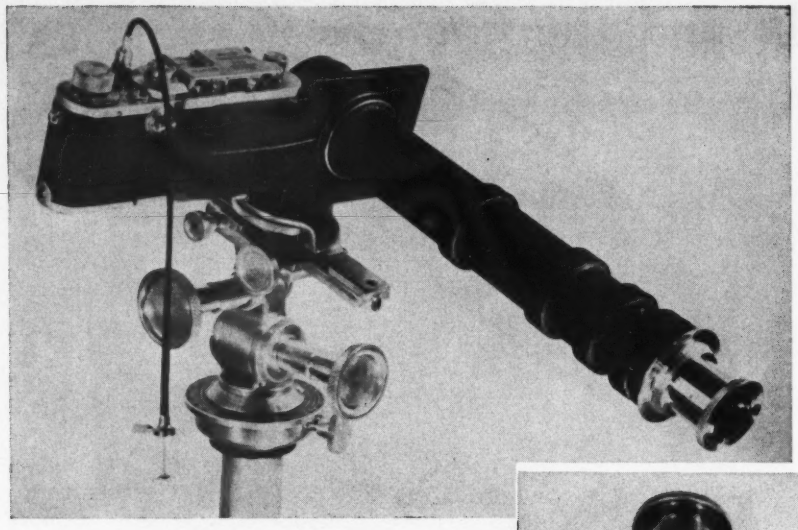
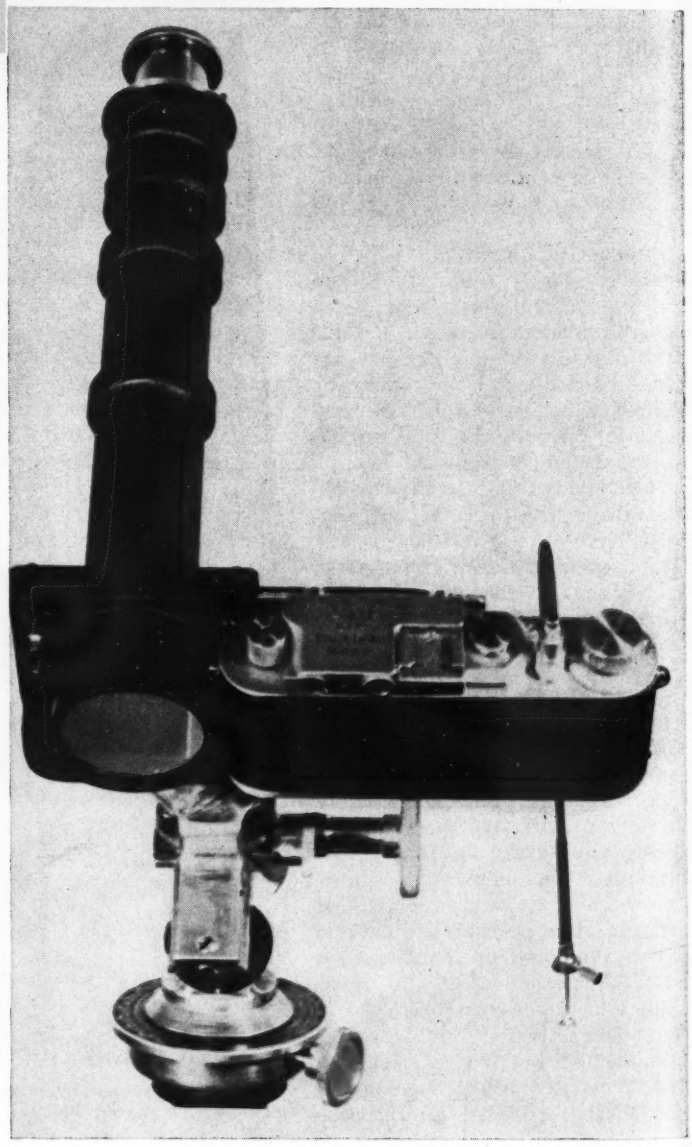


Fig. 3—Front view of a complete camera to which has been attached extension tubes and a sliding ground glass focusing attachment.

Fig. 4—Rear view of camera shown in Fig. 3.



shutter, the more light enters the camera. The faster the shutter, the less light enters the camera. But this shutter speed can be compensated for by having a larger lens opening. A good camera has a large lens opening, and a fast and a slow shutter. The better these are, the greater the value of the camera.

3. *Depth of Focus*—The depth of focus depends on the lens opening. The smaller the lens opening, the wider the depth of focus. If depth is desired, it is necessary to stop down the opening; but inasmuch as a smaller opening decreases the light, it is necessary either to increase the light at its source or to increase the time of exposure.

4. *Time of Exposure*—The shutter speed must be a little greater than the rate at which the object being photographed is moving in order to freeze it in the camera.

Stationary and Moving Objects in Bright and Dull Light

1. *Stationary Object in Bright Light*—Use a small lens opening and slow shutter speed so as to obtain a greater depth of focus.

2. *Stationary Object in Dull Light*—Use a larger lens opening and a slower shutter speed in order to admit more light.

3. *Moving Object in Bright Light*—Use a large lens opening and a fast

shutter speed to catch the action.

4. *Moving Object in Dull Light*—Use a larger lens opening and a slower shutter speed because more light is necessary. This is the most difficult of all photography.

Choice of Camera

There are many excellent cameras on the market; but the camera of my choice is the Leica, which illustrates the principles outlined here and has many advantages, such as:

1. It is adaptable. Ordinarily, it can be used as a candid camera. With the aid of extension tubes and a sliding ground glass focusing attachment, it can be used for close-ups of any desired nearness.

2. This camera is cheap to operate, because it can use motion picture film or 35 mm. roll film which is made up for every possible use, the latest being sensitivity to color and infra-red light. If a camera is too expensive to use, it will not be used, which makes this an important item.

3. It is portable.

4. There is no need for photoflash bulbs, because of the speed of the lens which is an additional saving.

The disadvantage of the Leica is its initial cost, but this can be reduced considerably by using the single exposure camera which is illustrated. With the principles in mind a camera can be constructed with a little ingenuity and research.

Application to Dentistry

The problem in dentistry is to secure clearly focused close-ups. The nearer the object is to the lens, the further away the image has to be away from the lens. This is accomplished in some cameras by means of double and triple extension bellows. A camera with bellows of this size is large, bulky, and enormous. On the Leica the same result is accomplished with extension tubes. The more extension tubes used, the closer and larger is the image.

In order to focus clearly, a sliding ground glass focusing attachment is used which works on the principle of focusing on ground glass and then sliding the camera back into position. Other cameras, in order to obtain the same results, do so by the use of mirrors or extra lenses or both. This again makes for bulk.

111 *East 167th Street.*

EXAMINATION FOR APPOINTMENT IN THE DENTAL CORPS OF THE NAVY

A competitive examination to select not more than twenty for appointment in the Dental Corps of the Navy will be held on July 5, 1938, at the Naval Medical School, Washington, D. C., Naval Training Station, Great Lakes, Ill., and Naval Training Station, San Diego, Calif.

A candidate for appointment in the Dental Corps must be a citizen of the United States, and must be between 21 and 32 years of age at the time of appointment, a graduate of a standard dental college, of good moral character, and of unquestionable professional repute.

Credentials relative to character, citizenship, date of birth, and education must be submitted and approved before an applicant can be authorized to appear for examination.

A circular which contains full information relative to the Dental Corps and describes the method of making application for appointment, may be obtained from the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

Exodontia for the General Practitioner

VICTOR H. FRANK, D.D.S., Philadelphia

CERTAIN FORCES ARE applied in exodontia which are based on laws of physics. In analyzing force as an objective fact, it may be considered as application and effect. Trauma is an effect, directly related to the force applied. More accurately controlled force, applied over a shorter period, should produce less trauma. With a correct conception of force in mind, exodontia may be made simpler. Force as required in exodontia may be divided into three parts: (1) engine pressure; (2) hand pressure, and (3) multiple force. Engine pressure is limited to the use of burs and drills; hand pressure to forceps and the various types of exolevers and ossisectors; whereas multiple force is a term I apply to combinations, such as the mallet and chisel. Exodontists use forceps freely, and, therefore, can easily master the hand chisels and levers.

Laws of Physics

The first purpose of ossisectors and exolevers is to exert a force greater than is possible with the hands. There are six simple mechanical devices through which one may multiply force: (1) the lever; (2) wheel and axle; (3) pulley; (4) inclined plane; (5) wedge, and (6) the screw (Fig. 1). The two most concerned here are the lever and the wedge. The Class 1 lever (Fig. 2) is a bar with the force applied downward on one end with a fulcrum to lift an object on the other end. The Class 2 lever (Fig. 3) is an upward force on the lever; an object is lifted somewhere between the lever and the fulcrum on the other end of the lever. A Class 3 lever is disregarded here, because it does not apply to exodontia. The wedge and inclined plane are also used.

Levers, such as the LeCluse, or one in which the lever is turned with the crossbar, demonstrate the principle of the wheel and axle. The Class 2 lever is slightly more efficient, because it exerts less pressure on the fulcrum. On the other hand, the Class 1 lever is easier to apply more accurately. In the mouth where the distance from the tooth to the fulcrum is variable and pressure is distributed on the shank of the instrument as well as on the handle, it is impossible to figure accurately. This, however, can be deduced and remembered:

1. *The closer the fulcrum (the bone that the instrument is laid against) is to the tooth, the greater the lifting force.*

2. *Fulcrum stress undoubtedly causes trauma, and the bone used as a fulcrum is injured in direct proportion to the amount of force applied. In this respect I believe that instruments used as a wedge create less trauma.*

3. *Especially in the use of forceps in the removal of teeth the exodontist must utilize his own body to exert force.*

The easy teeth are removed with a motion of the hand. Let the tooth be a little more difficult, and we put the wrist, then the elbow, the shoulder, and finally, the upper part of the body in the extracting movements in the effort to dislodge the tooth. We accomplish this by a locking of the parts. If the hands are insufficient, then we lock the joint and move it and the arm as a unit. Sometimes, we lock the hands, elbow and shoulder, and use the torso to rock the tooth. This is easily understandable when we consider that we are merely making this force work at the end of a longer and more powerful lever.

Selection of Instruments

Forceps are built to grasp the gingival portion of the tooth so that the tooth may be removed with this force. Forceps are also designed with beaks that wedge themselves farther up the root or into the bifurcation as pressure is applied. Grasping forceps I define as those with more or less parallel beaks, so that when they are closed, they do not ride higher on the tooth. In the wedge-type forceps the beaks are curved more on their long axis, and are concave on their inner surfaces. When this type of forceps is closed in the handle, it will have a tendency to wedge farther up the root. Forceps with bifurcations in the beaks, or the cowhorn-type are good examples. I believe the careful exodontist will have instruments of both types. It is often necessary to avoid a pressure that will crush the crown of a carious tooth. Forceps that ride higher will help solve this problem. When an upper third molar can be snapped out, it is because of the conical shape of the roots, and the wedging action of the forceps. On the other hand there are many teeth that require strength as well as technique. In cases of strong teeth with infection in the structure about the tooth, I believe the grasping forceps are indicated, so that the forceps will not be driven up and thus traumatize the infected area.

Forceps should be sold to persons with a regard for their strength and temperament. A weaker person should, I believe, use only heavy instruments. To compensate for a lack of strength on the part of the operator, the levers of the forceps could be longer; the forceps handles longer and bigger in order to rock more easily, and rotate and deliver the tooth. The stronger person can more readily modify his technique according to his instruments. The factor of fingers, whether long-fingered or large palmed, must also be considered. Hand pressure instruments of all types: forceps, elevators, and chisels are more efficient when they are suited to the hands and fingers of the operator. Also by trial and error operators should determine whether they prefer forceps with the handles at right angles, such as the Ash forceps, or forceps with the handles in the parallel direction of the beaks. The main difference is that with the handles at right angles (Ash type)

there is a stronger action for rotating or rocking a tooth. With the handles parallel to the beaks, there is a stronger lever action to deliver or extract the tooth in a straight pull. It is a question of choice.

Instruments that are meant to be sharp should be constructed differently from instruments that are blunt-edged, and this holds true if an instrument is to be used to cut or to push through bony structure.

There are a few types of cases in which crushing or cutting forceps are useful. Forceps that would cut the buccal plate would facilitate the removal of teeth with bulbous roots or exostosis. By cutting this plate, it can then be spread and the root removed. I have designed such forceps. The lingual beak is flat and wide, covered with a piece of rubber tubing. The buccal beak is a thin sharp convex beak terminating in a point. The lingual rubber-covered beak is designed to be placed over the tip of the root, outside the buccal plate. The handles are squeezed and the buccal beak bites through the process and makes a hole. The forceps can be raised a trifle and the procedure repeated. In this manner the buccal plate can be accurately incised; although generally, after the first or second squeeze the root is elevated by the pressure under it.

Trial and error, however, must serve in the correct selection of instruments. Instruments that have outlived their usefulness should be discarded. Sometimes it is possible to adapt instruments better to suit one's needs. I have frequently beveled edges of cutting instruments or bent them into another angle to suit my purpose.

Application

Routine—First of all, an exodontist should set up certain rules for himself to follow. Some men extract the lower teeth first and then uppers, because, if the uppers were removed, the blood would run down and make it more difficult to see in removing

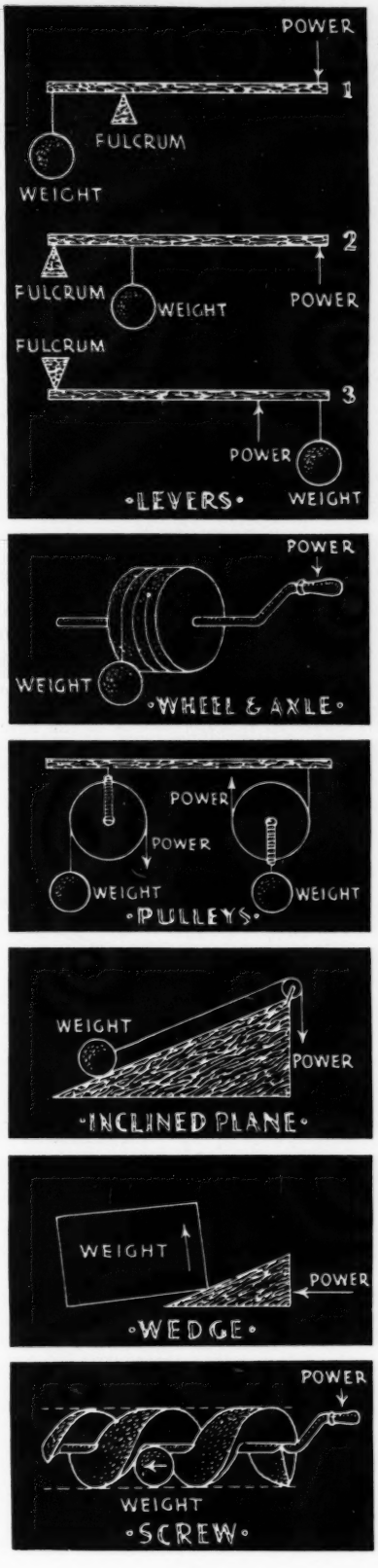


Fig. 1—Examples of devices for the multiplication of forces.

the lower teeth. Others reverse the procedure, because they contend that if the lower teeth are removed first there is the possibility of restorations dropping from the upper teeth when they are removed into the sockets of the lower jaw. This condition may be prevented if gauze is placed over the extracted areas to keep out fragments from other teeth. I have found it more satisfactory in my practice to remove the lower teeth first and to work from the back of the mouth toward the front. If it is a multiple extraction, however, with teeth to be removed in the upper jaw and lower jaw, on the right and left sides, then I remove the lower teeth on one side and the upper teeth on the same side before placing the prop in and changing sides.

Condition of Mouth Important for Extraction—Gums in a highly inflamed state, or in the presence of Vincent's infection should not be subjected to the traumatism of exodontia. An infection around a partly erupted lower third molar, caused by the flap of gum being exposed to saliva and food débris, should be treated. Irrigation and then application of a cauterizing agent, such as 7 per cent chromic acid, will frequently permit removal of these teeth at the first visit. When in doubt, or on the appearance of a low resistance on the part of the patient, the operation should be postponed until the inflammation subsides.

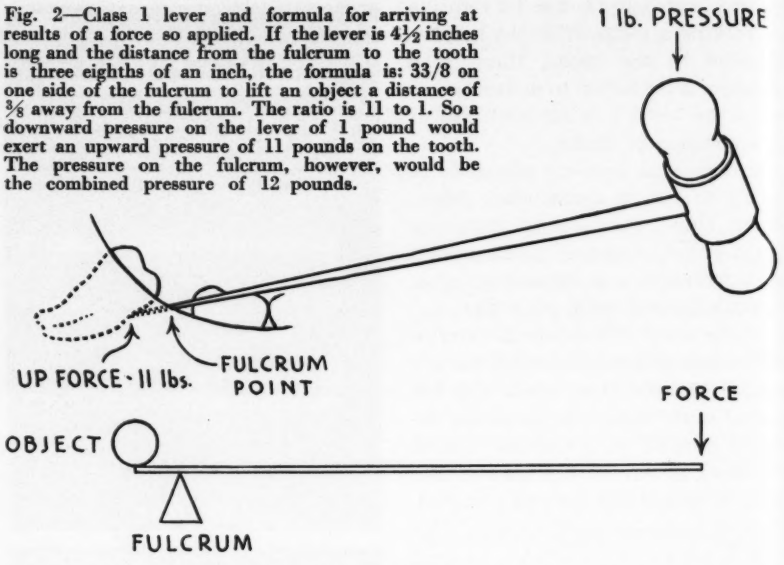
Precautions before Inhalation Anesthesia — After induction, before starting the operation, some sort of a pack, (oral-pharyngeal partition) should be placed. This will safeguard the patient against the possibility of swallowing fragments of teeth, restorations, or blood, and help the anesthetic to the extent of stopping mouth breathing which upsets the smoothness of the anesthesia. These partitions or packs should be made with a great deal of care and attention. I have tried loose cotton, plain gauze, cotton and gauze combinations, gauze in a long strip, and sponges with a net about them. The specially prepared ones are good, but I am now using a square piece of gauze filled with loose cotton; folded so that the four ends are tied together; then tied four ways like a

bundle, leaving a long piece of twine extending from it. With this type I can place it in the roof of the mouth over the tongue as the pack is fairly flat. This pack can be removed under most circumstances; however, once the long twine caught between the folded end of a rubber mouth prop and with the patient biting tightly on the prop; it was impossible to utilize the twine to remove the pack. Fortunately there was no necessity for quick removal. Having passed through the experience of an emergency tracheotomy, I can only say that one's ideas change to the extent of looking for safety above other considerations. If a pack is easily removable, then I am willing to sacrifice some of the advantages of a pack that might more completely block the open airway in the mouth.

Extraction of Upper Anteriors—Most upper anterior roots are conical in shape; they can, therefore, be removed with instruments in a wedge action. A scoop-shaped wedge is placed at the gingivae and the edge of the instrument is insinuated between the root and the surface of the socket. I like to describe this as saying that the instrument must be placed where the peridontal membrane is, and then the instrument is pushed up on this membrane. This is done lingually or buccally. If the adjoining teeth permit it, this may be done mesially or distally. Care should be taken not to touch any adjoining tooth, for this technique is one that calls for only a wedging action. After this instrument is pushed on several sides, the root will begin to be moved downward. The following axiom is involved: Two objects cannot occupy the same space at the same time. In other words, the instrument having a wedge shape enters the socket from which the root must, therefore, be removed.

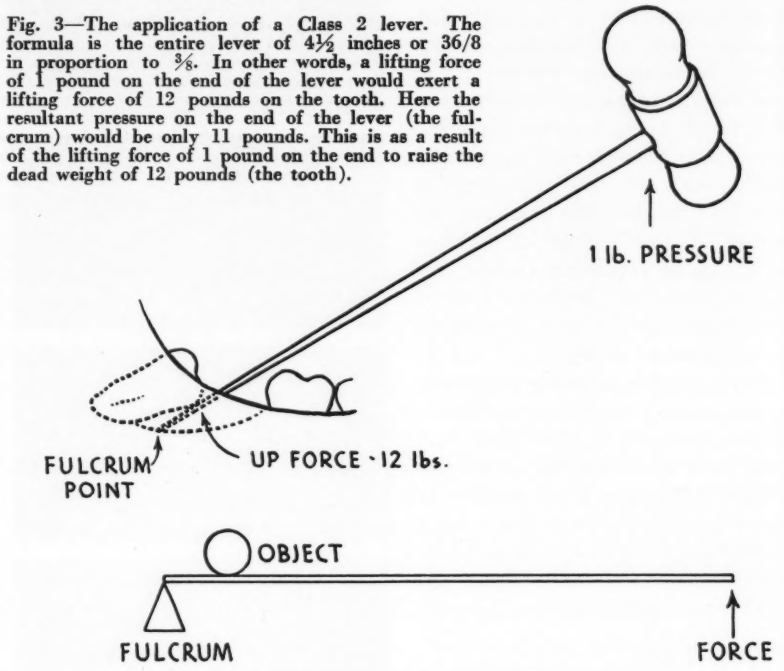
Extraction of Upper Molars—A large strong tooth that is difficult to move with forceps should be first loosened with a scoop similar to the one already described. The scoop is run alongside the roots lingually and buccally. If this fails to allow forceps removal, it may be necessary to perform an easy quick surgical removal. The forceps are loosened from the tooth; the buccal bifurcated beak

Fig. 2—Class 1 lever and formula for arriving at results of a force so applied. If the lever is 4½ inches long and the distance from the fulcrum to the tooth is three eighths of an inch, the formula is: 33/8 on one side of the fulcrum to lift an object a distance of ⅜ away from the fulcrum. The ratio is 11 to 1. So a downward pressure on the lever of 1 pound would exert an upward pressure of 11 pounds on the tooth. The pressure on the fulcrum, however, would be the combined pressure of 12 pounds.



CLASS I LEVER

Fig. 3—The application of a Class 2 lever. The formula is the entire lever of 4½ inches or 36/8 in proportion to ⅜. In other words, a lifting force of 1 pound on the end of the lever would exert a lifting force of 12 pounds on the tooth. Here the resultant pressure on the end of the lever (the fulcrum) would be only 11 pounds. This is as a result of the lifting force of 1 pound on the end to raise the dead weight of 12 pounds (the tooth).



CLASS II LEVER

is placed over the gums and buccal plate about three sixteenths of an inch; the lingual beak is again placed at the gingivae and the handles are squeezed. This should bite through the buccal plate into the bifurcation higher on the roots. Then the forceps are replaced about the gingivae of the tooth, firmly driven up the roots, and the tooth slowly removed. The portion of bone bitten off will generally come away with the tooth.

Extraction of Lower Bicuspids—Lower bicuspids may be removed by a great many methods and probably all are satisfactory. The instrument I have described (rubber-covered

forceps with sharp point) may be used to cut the buccal plate. The sharp point entering under the root frequently forces it out at once. If not, the forceps can be raised closer and closer to the gingivae and the buccal plate incised in a straight line over the root. If there is a marked curvature, or ecostosis, this will be necessary. Then after the buccal plate is cut, the plate can be spread and the root forced out. Naturally this requires extensive after-care; that is, suturing treatment.

Another method is to force a sharp, pointed instrument, such as a Crane pic, through the buccal plate and below the root. The instrument is then turned in an endeavor to exert pressure from below the root, thus forcing it upward out of the socket. Surgical removal may be just as easy, but this technique is not difficult, and can be done quickly.

Extraction of Lower Molars—Lower molar roots are really the easiest to remove. A chisel or sharp pick is used to separate the roots. A Winter (old type) elevator is inserted in the split bifurcation and the root is elevated out. Then the opposite elevator is placed in the socket of the extracted root and turned against the root through the septum. The other root will invariably come out easily. The loosened septem should be removed as well.

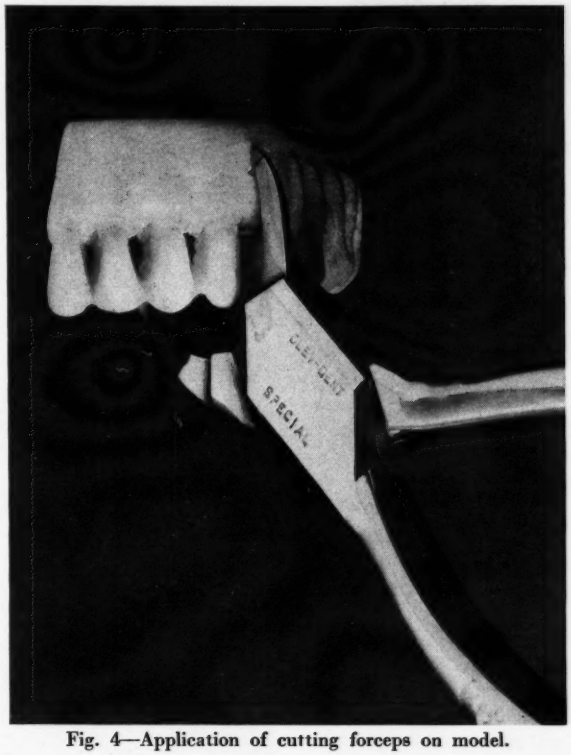


Fig. 4—Application of cutting forceps on model.

Postoperative Care

Bleeding—Bleeding in the average case can be controlled easily by complete removal of the clot over the bleeding point and then exerting direct pressure at this point or the bottom of the socket. To do this I use stryphnon gauze which is a small square of gauze specially treated with an effective hemostatic agent.

Pain—The first thing to determine is whether the pain is caused by an inflammatory condition, or whether it falls into that general classification of a dry socket. If pain is caused by an inflammatory condition, then the operator should alleviate the infection first with drugs and treatment. If the pain is due to a dry socket, clean the socket, cauterize it, and then pack it loosely with a piece of gauze impregnated with a healing salve. It is my thought that pain due to dry socket arises from the open condition of the bone transmitting irritations, such as air, saliva, and food débris, which set up a neuralgia. If this is true, then the cleaning of the socket and the mechanical closure with a piece of gauze and sedative paste relieves the condition almost immediately. Pack loosely and change every forty-eight hours.

Use of Ice and Heat—Moist heat will not necessarily cause pointing and make it necessary to incise, but will often help the infection to resolve. Hot compresses of magnesium sulphate have frequently reduced an incipient cellulitus without the necessity of the knife. Ice can dispel and harden a swelling, but will not point it. Heat, on the other hand, can point an infection and in other cases will dispell it when there is drainage. I would advise moist heat when there is drainage; and ice only when there is no drainage and the operator believes that there is a good chance of absorption of the infection.

Mandibular Nerve Trauma—Random gouging with hand pressure instruments or mallets and chisels has no place in exodontia if mandibular nerve injuries are to be decreased. I believe that the reason so many of the mandibular nerves are traumatized in the removal of broken molar-roots is because we fail to realize the abnormal positioning of the roots and use the incorrect angle of the instruments. Broken roots often show the bone cut away too deeply. The roots are to be found at an angle under the buccal plate of bone. If these are not uncovered so as to be seen, the operator should be sure to go for them under the buccal plate and keep from gouging straight down. Another common mistake in removing these roots is the use of wrong elevators. The points of most instruments are constructed so that the lifting force is on objects directly below the instrument. On these misplaced roots, the elevators must be placed correctly and have shapes and angles that will allow them to engage the root.

1800 *Pine Street.*

Occlusion: Its Effect on the Nose and Face

H. C. POLLOCK, D.D.S., St. Louis

ABOUT THE TURN of the century, Matthew H. Cryer[1] wrote that the most important factors concerned with the formation of variations of the anatomy of the face, head and skull were nutrition and occlusion of the teeth. Cryer's classical work in 1901 for the first time impressed on physicians and dentists that the typical or "typal" form of bones of the head and face are not often found in nature; that is, by way of illustration, if one thousand sphenoid bones were photographed and a composite picture made of the entire number, the average could be accepted as the typical or "typal" sphenoid bone, but (as Cryer pointed out) no individual bone can be construed as the "correct type." There is no such thing, according to this authority, as a perfect sphenoid bone. Cryer also emphasized the fact that the variations noted in the bony structure of the head and face occur so frequently that it is difficult at times to know which is normal and which is abnormal anatomy, and these variations are characteristic of the entire anatomy of the body; however, they are more manifest in the internal anatomy of the head than elsewhere. Notwithstanding that it is generally recognized (particularly among rhinologists) that there exists a wide variation in the bone anatomy of the maxillary and nasal cavity region, there seems to be ample evidence to indicate that the occlusion of the maxilla and the mandible (through the medium of the teeth) has an important bearing on the architecture of the anatomy of the head, face, and skull. To put it plainly, the influence of good occlusion of teeth is important in helping to mold the shape and form ultimately assumed by the bones of the head in their relation to one another.

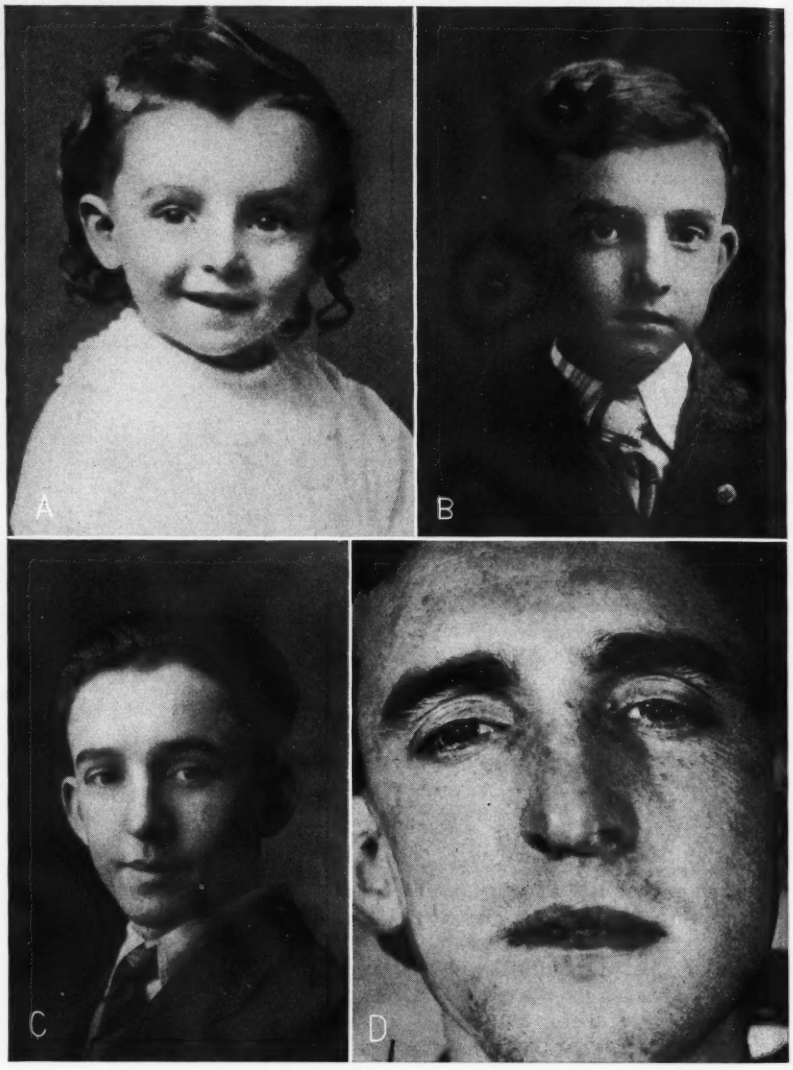


Fig. 1—A, Definite asymmetrical development of the face, particularly in the right malar and right mandible. B, Note progressive development and definite tendency of median line of head and face to shift to right. It can be observed that the mandible has gone over to the right. The lips have taken on a definite angular appearance. C, Same patient; on account of inclination in the pose, it is difficult to show the progressive shift of the mandible to one side. D, Same subject in adult life, age 22 years. Deviations are plainly marked over to ala of the nose and orbit and frontal bone region.

Perhaps this subject attracted more attention thirty years ago than it does in recent times, for it is recalled that Angle,[2] Ketcham,[3] Dewey,[4] Hellman,[5] Noyes,[6] Mershon,[7] and others gave this subject considerable attention. Some reported cases in which the nasal space was lacking in development; in which the dental arches and maxillary bones were narrow, and in which the removal of adenoids had

[1]Cryer, M. H.: Internal Anatomy of the Face, 1901.

[2]Angle, E. H.: Malocclusion of the Teeth, Seventh Edition.

[3]Ketcham, A. H.: Treatment of the Orthodontist Supplementing That of the Rhinologist, Laryngoscope, 22:1286 (November) 1912.

[4]Dewey, Martin: Practical Orthodontia, St. Louis, C. V. Mosby Company.

[5]Hellman, Milo: Changes in the Human Face Brought About by Development, Int. J. Otho. & Oral Surg. 13:475 (June) 1927.

[6]Noyes, F. B.: The Development of the Teeth and Occlusion As Factors in the Development of Facial Bones, D. Cosmos, 55:117 (February) 1913.

[7]Mershon, J. V.: Facial Changes, D. Cosmos, 77:1068 (November) 1935.

failed to be of any appreciable benefit to correct mouth breathing. Angle pointed out that the "balance of all forces of occlusion should be established" to stimulate growth and overcome arrested development of the maxillary structure, and that treatment should be utilized to this end so far as possible. The theory advocated was that by the widening of the dental arches and placing the upper and lower teeth in their normal relation to one another, the percussive force in the masticating and triturating of food would thereby be transmitted through the individual teeth to the maxillary bones, and indirectly reflected through the palatine processes to the floor of the nose and the paranasal sinuses. It was contended that these forces, when correctly distributed, contribute appreciably to the growth of the area of the nasal cavity; also in cases in which the septum of the nose has been deflected the septum has been greatly benefited by balanced occlusal relations when these normal relations were established in balance in childhood.

Ketcham,[3] particularly, cited a large number of cases in which children with constricted nasal spaces developed increased breathing areas as a result of widening the palate. He pointed out that the majority of these patients improved in general health and gained in weight during the period of active treatment. Evidence was offered favorable to the clearing up of maxillary sinusitis and important nasal disorders, concurrent with and subsequent to the expansion treatment. Bogue in 1910 advocated the vigorous expansion of deciduous dentures for the purpose of widening the nasal fossa, and as a supplemental treatment in chronic nasal disorders. At a meeting of the section on laryngology and rhinology of the New York Academy of Medicine as far back as 1912, a paper was read by W. H. Haskin, M.D., on the relief of nasal obstruction by orthodontic treatment, and a plea was made for the early recognition and correction of maxillary development. At the same meeting, F. B. Noyes read a paper on the development of the teeth and occlusion as a factor in the development of facial bones. Another paper was read by Ketcham on treatment by the orthodontist supplementing that by the rhinologist. This is all rather significant evidence at the present time that the question was construed by both rhinologist and orthodontist to be important twenty-five years ago, and probably it was given more of the attention that it merits at that time than it is given now, at least by the dental profession.

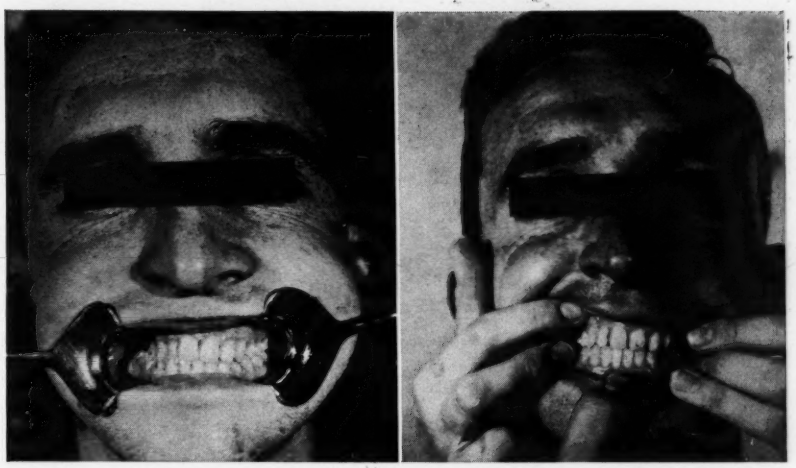


Fig. 2—Same case as Fig. 1, taken when patient became an adult. A, Note lingual occlusion of the upper teeth from the lateral distally on the right side. It is apparent that the sidewise shift of the mandible in the percussive action in mastication has been influential as an etiologic factor in the development of the asymmetrical anomalies of the face. B, Occlusion after it had been corrected by orthodontic means; nevertheless, it is observed that the line of occlusion (or plane of occlusion) is definitely not in harmony with sagittal, orbital, and other planes of the cranium.

We can be optimistic in crediting palate expansion treatment with some responsibility at least in weight gains and growth activity when it is recalled that the investigators cited have reported gains of from 15 to 25 pounds in some of their patients during the first year's treatment while widening the maxillary arch.

Another point of interest in this connection pertains to the more recent and liberal views on the extraction of two or more upper bicuspids in order to assist in the correction of, particularly, Angle 2, Division 1 cases. It is obvious that there is an inclination to overlook the involvement of the internal anatomy of the face, particularly of the nasal cavity, in advocating such compromise treatment. Extraction of teeth, as was pointed out years ago is an effective and simple method to facilitate the correction of irregular teeth; however, that such procedure leaves the maxillary area just as narrow subsequent to treatment as it was before (and sometimes more so) is certain, and there are no beneficial effects whatever on the width of the nasal cavity. By the extraction of upper bicuspids (particularly in early childhood) the patient is left with an undeveloped nasal cavity and with a small dental arch in proportion to the number of teeth that have been extracted in the upper arch, because extraction promptly arrests growth in that area.

Angle proved that by retaining a full complement of teeth and developing the alveolar process over the roots of the teeth, the apical base of the entire maxillary teeth will be larger and will occupy more area than if the teeth were extracted for the convenience of correcting malocclusion. This is the high spot that so many seem to overlook who advocate the radical extraction of teeth for the convenient and easy correction of malocclusion. If the extraction of teeth in children arrests development of the maxillary bony area, then the children would be better off with the malocclusion uncorrected. If the apical base is maintained to its maximum circumference and size, it has been shown that this bulk is effective in the ultimate destiny of the size, shape, and form of both internal and

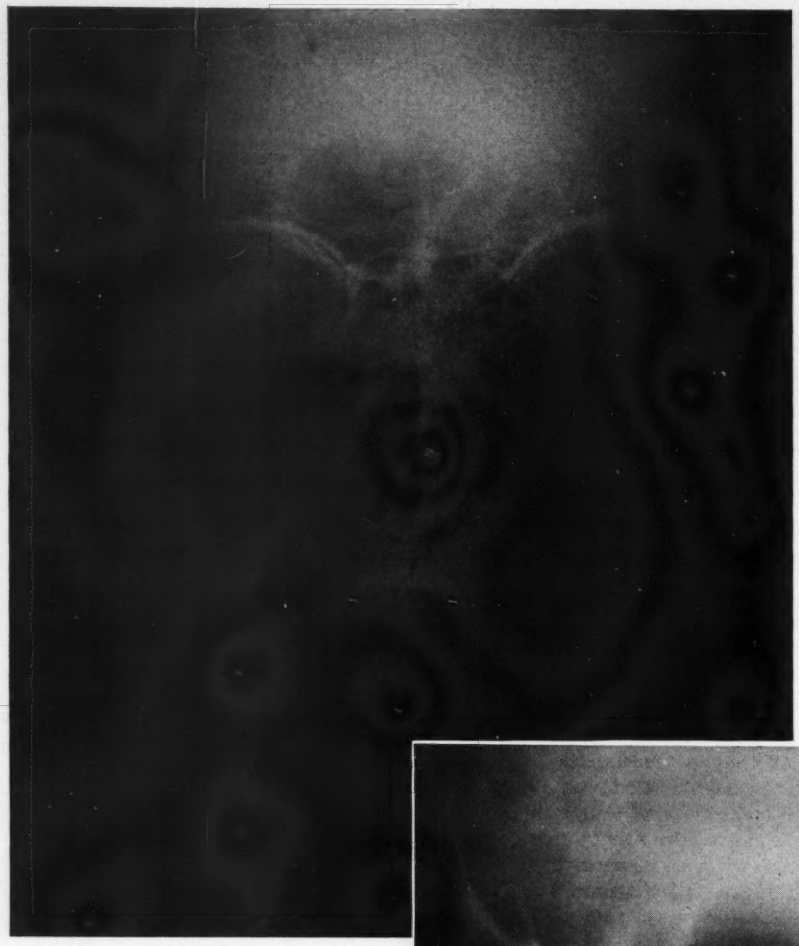


Fig. 3A

Fig. 3—A, Anteroposterior roentgenogram of head and face of same patient shown in Figs. 1 and 2, in adult life, showing distortion of the nasal cavity, maxillary sinuses, and particularly the nasal septum. The nasal septum is definitely deviated to one side, and there is a marked disproportion in the vertical anatomy of the cavity of the nose. There is a wide variation in size and shape of the frontal sinuses, and the oblique position of the plane of occlusion is plainly observed here, as related to the floor of the nose.

Fig. 3—B, Roentgenogram of the same case shown in Fig. 3—A, taken two years subsequently, after correction had been made. There is apparently some change in the internal anatomy of the nose, and particularly has the deviation of the septum been remedied somewhat even in adult life when little change should be expected.

Fig. 4—Case of a child with essentially the same history of development and similar symptoms as the case shown in Figs. 1, 2, and 3. In all these cases in which there is lingual occlusion of upper teeth as related to lower teeth on one side, there has been found asymmetry of the maxillary bones as well as of the anatomy of the nose and maxillary sinuses. This case further illustrates the usual case presented to the orthodontist showing asymmetrical development of the face, the deviation starting in early childhood. It is believed that early correction of these cases is important on account of the disfiguring facial disproportion of the internal anatomy of the face and nose. It is thought that this particular type of malocclusion is accountable for the progressive development of many deviated nasal septums, because of the shifted and unbalanced percussive force of mastication, directed on the bias.

external anatomy and the architecture of the osseous structure of the head.

Rhinologists are acutely interested in this subject of nasal and upper dental arch deformities. In examining the more recent medical literature, it is obvious that the medical profession regards as unsatisfactory most of the theories about these wide variations of anatomy that occur particularly in the nasal cavity. They are agreed, apparently, that there are no anatomically perfect interiors of noses. At the same time, the contention is that the more marked the de-

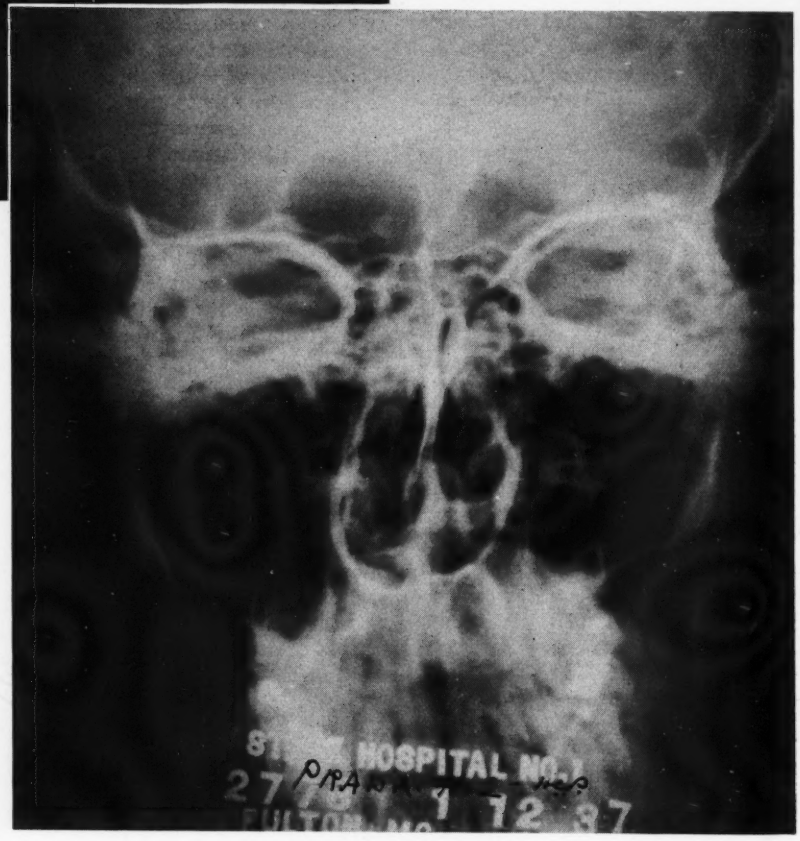


Fig. 3B

Fig. 4

viation of the septum, the more extreme is the deformity of the maxillary dental arch. Further evidence, it is believed, points to the fact that nasal septal deformities *grow no worse* after puberty. This latter age corresponds to the time at which all the teeth have erupted and taken their places within the dental arch and accordingly is further evidence of the close developmental relationship of the two structures.

Adkins[8] says that nasal anomalies are rare in the Negro race; that the rounder the upper dental arch, the more rarely do nasal deformities occur. He is further of the opinion that the facial difference in the occurrence of septal and dental deformities may be accounted for by the fact that one race has a greater pelvic diameter than another, which is responsible for a quicker and shorter period of labor for the mother; therefore there is less pressure on the soft cartilage frame of the infant's face as it passes through the pelvic strait. Another way of stating it (according to Adkins) is that nasal-dental arch deformities closely parallel in their abnormal characteristics a percentage of certain types of obstetrical deliveries. For instance, he points out that in one face presentation during delivery, he found that both maxillary bones were closely approximated, forming an acute angle at the articulation between the two superior maxillary bones, and that the nasal cartilage was severely wrinkled. In observation of infants born through caesarian section in eleven cases, Adkins[8] says there were revealed no septal deformities and all infants were delivered with perfect dental arches.

Obviously, then, there is still a wide variation of opinion as to the exact etiologic factors involved in nasal osseous asymmetry; notwithstanding, there are various deformities of these structures which can plainly be traced to a dental and occlusal origin. (See accompanying illustrations.)

Inasmuch as rhinologists are agreed that deformities of the septum and palatal arch are one of the chief causes of disease of the upper respiratory passages, and inasmuch as the theories advanced as to the cause of septal deviations are only opinions based on clinical observation, it seems logical to assume that the dentist has been entirely too modest in contributing his clinical observations to the sum total of knowledge in this important field. The widening of his field of activity into the important area of prevention and improvement of nasal and facial anatomic anomalies seems not only important but urgent.

The question of the extraction of normal teeth for both the prevention and the correction of malocclusion has again been brought up for discussion within the last few years. In glancing over various articles written by those who enthusiastically advocate this practice, it becomes obvious that those who recommend this practice confine their appraisal, diagnosis, and prognosis to the proposition of anticipating the end-result only by the yard-stick of the teeth. It is to be remembered that the extraction of teeth as a compromise treatment for the purpose of expediting the correction of malocclusion in adults is one thing, but that extraction in growing children is another. Dentists with full clinical experience well understand this; however it is plainly not so well realized by those who are only tooth-minded and who are not biologically-minded in their point of view pertaining to growing tissue and structure. In growing children, extraction too often fully arrests the growth of alveolar structure in the region of extraction of the permanent teeth; accordingly, the bone might be called dwarfed at the site of the injury.

Conclusion

There seems to be a logical explanation as to why dentists in the past have paid less attention to the supplemental effect that treatment has on the anatomic variations of the nose and internal anatomy of the face than they have to the maxilla and the mandible, for only recently have we

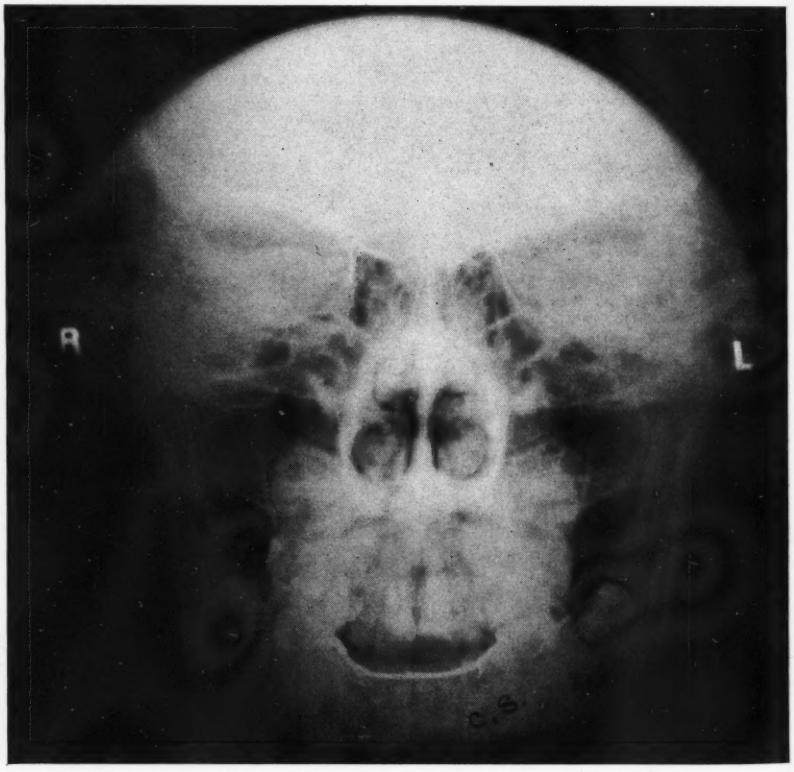


Fig. 5—Roentgenogram of same patient shown in Fig. 4. Note disproportion of entire nasal cavity and nasal septum to the internal anatomy of face.

[8]Adkins, G. E.: Chief and Most Common Cause of Nasal and Upper Dental Deformities, South. Med. J. 29:603 (June) 1936.

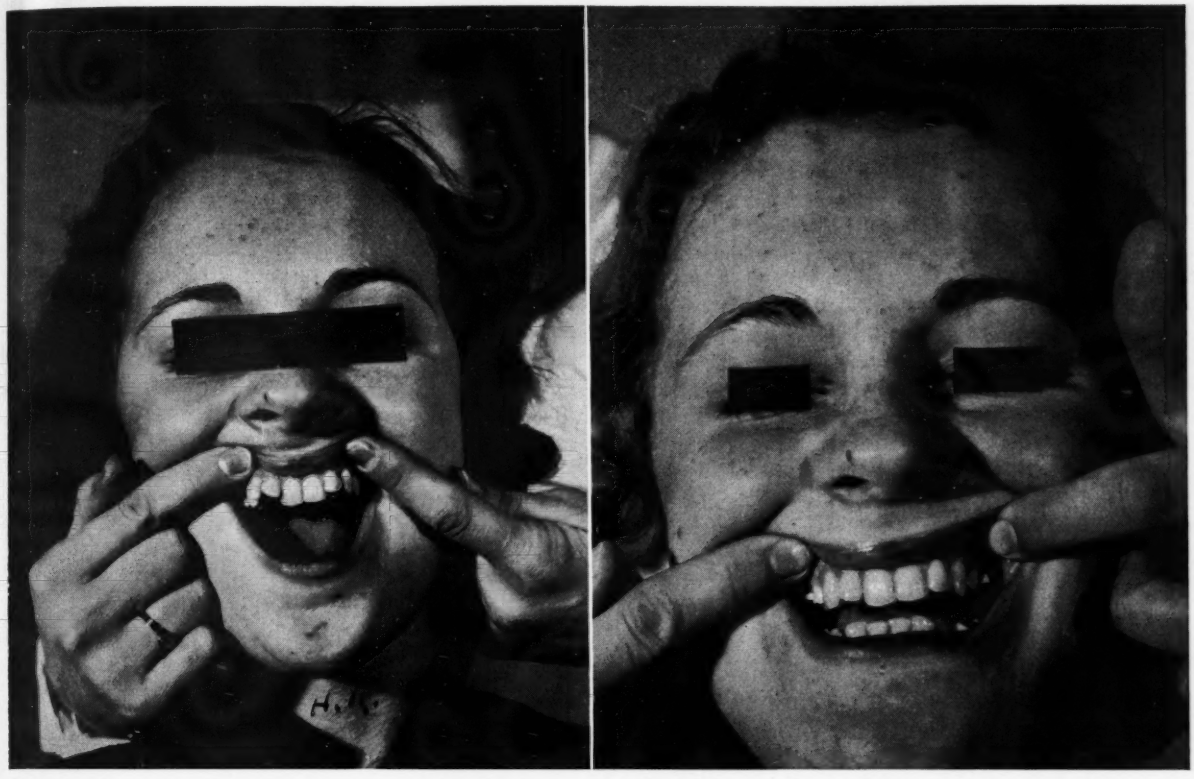


Fig. 6—A, A case that is a typical and nonclassical in appearance. It is extraordinary in that it is mutilated and unsightly. The lower cuspids in this case were extracted early in life for the purpose of "making room" for the remaining teeth in the lower arch. After a period of years elapsed, the upper arch, making an effort to adapt its growth to the lower in which the teeth had been extracted early in life, failed to develop a normal alveolus to accommodate the teeth. Accordingly, the apical base is obviously too small, manifesting itself in turn in a lessened area of the maxillary sinus and floor of the nose.

Fig. 6—B, A rather satisfactory correction from the standpoint of appearance, but the impairment wrought to the entire maxillary area has in no measure been corrected, because it is too late in life. Early extraction had plainly resulted in arrested development of bone and the co-related accessory sinuses.

been aware of the more remote anatomic effects which often occur as a result of treatment in young children and which is reflected throughout the internal structures of the lower half of the head. We now know (as a result of the work done by Howard and others) that "growth spurts" accompanied by widening of the maxillary arch and the balancing of occlusal relations together with the important element of time affect the entire cranial organism; hence, we are more conscious that malocclusion is one of the important factors in the relation of the facial anatomy to the nose.

Early extraction of permanent teeth in childhood should be seriously avoided for many reasons and should be resorted to only in cases of emergency. One of the reasons that is often overlooked is that the teeth have an important bearing on the growth of the floor of the nose and accessory sinuses. The dental profession should more carefully expand its service in adopting routine practice that will contribute to the full development of the nasal area, and by all means, whenever practicable, should refrain from extraction of permanent teeth in children, as this may have more far-reaching effect in ultimate harm than the mere loss of a tooth. The extraction of one or more teeth may temporarily improve the appearance of a malocclusion in the anterior part of the mouth. After a ten-year growth period, however, the cure may prove to be worse than the disease, because of the ultimate effect produced on the nasal fossa and accessory sinuses.

4482 *Washington Boulevard.*

The Editor's Page

THE NEWER knowledge of diagnosis does not, so far as I know, include the theory that Class 3 malocclusions are correctable by sucking the thumb, nor are stillbirths at term the result of submerged teeth. Recently I have heard these fantasies of dental diagnosis recounted by patients. Let us grant that patients may garble the story somewhat, but no patient has an imagination so wild as to invent such pseudo-scientific stories from whole cloth.

The first was the case of a girl of 10, one of several children in a family, not too well-to-do. The child was particularly in need of orthodontic care, because the malocclusion was disfiguring. There were other persons in the family who needed the ordinary run-of-the-mine dental treatment; inlays, amalgams, bridges. The budget was limited, so the attending dentist who masquerades as an ethical practitioner was required to make this choice: "If I send the child to an orthodontist, he will get most of the money that this family has allocated for dental care. The restorations for the adults in the family will be neglected." This dentist, not wishing to pass up his own economic opportunity, minimized the importance of the malocclusion and disparaged the skill of the orthodontist in general. He made the bizarre suggestion for treatment that if the child would suck her thumb the Class 3 malocclusion would be corrected. Perhaps he reasoned that if Class 2 malocclusions with their consequent under-development of the lower jaw were sometimes due to thumb-sucking, Class 3 malocclusions with the over-development of the lower jaw might be corrected by the same forces. We are being most charitable when we say that his ignorance of biology and dentistry accounted for his outline of treatment.

Another page from the book of weirdness concerns a woman at the other end of the economic scale; one who wore a mink coat, who had servitors bowing her in and out of her home and cars, who wasn't sure she would have time for her dental treatment because of heavy travel and social schedules. This patient had five impacted teeth (four third molars and a lower bicuspid) which apparently were not infected; were not causing pressure symptoms; were not endangering the surrounding teeth. She had recently undergone the severe physical and mental shock of delivering a stillborn baby. A dental consultant is alleged to have said that such conditions are frequently the result of impacted teeth. As he sharpened his scalpels and elevators and drills, the patient very properly put on her thousand dollar mink coat and left his office. This case is clearly one in which surgery was outlined because of the bulging wad.

When dentists in practice are told about cases such as these cited, even if a liberal allowance is made for distortion of facts by the patient, the temptation is strong to leap into the pulpit and preach about ethics. It is easy for an editorial writer to chatter like a common scold. In the cases mentioned, once again we are impressed with the fact that all quacks do not flaunt neon signs and peddle hand bills. There are many devout members of dental societies who practice in the sanctity of their own offices this kind of highwayman dentistry. At least the highwayman does not pose as a respectable member of society!

It is good ethics and good business to do the necessary things and to be properly paid for them. We are delighted to see dentists paid well for services well performed. What constitutes a fair fee and what an excessive one cannot be called precisely as the cost of a railroad ticket, for example. The sliding scale of fees is an accepted practice among professional men. This practice has been criticized by those in the upper brackets of payment. But so long as we must carry the load of many people in the lower levels, we will probably continue to ask larger fees from the well-to-do. It seems proper, however, for every person to know in advance of treatment what his obligation may be with respect to the fee. The prevention of patient-misunderstanding is an economic ideal in practice. One certain way to practice this type of prevention is *to inform patients before you perform.* Tell patients honestly what you can and cannot do; how you are going to do it; and how much it will cost. The bald word "cost" may be offensive to the ears of some dentists who still echo the dental college platitude, "Give them good service and the fee will take care of itself." Patients are entitled to honest professional opinions; they are also entitled to a direct business-like approach.

The Relationship of Dental Infections to Diseases of the Eye

M. MARTYN KAFKA, M.D., Brooklyn

OF SEVERAL THOUSAND patients examined by me during the last few days at Bellevue Hospital, 250 definitely showed a close relationship between dental infections and diseases of the orbit. Many of these cases were referred from the ophthalmologic department to the otorhinolaryngological department for consultation. After a careful search is made one can usually locate the origin of infection. It is for this reason that the following aids to diagnosis are employed: the Wassermann test; chemical analysis of the blood; roentgenographic examination of the sinuses and the teeth whenever indicated; a study of roentgenograms of the mastoid; examination of the chest to rule out tuberculosis; a complete study of the blood pressure; and frequent examination of the urine.

I have found that retrobulbar neuritis may not only be caused by foci of infection in the teeth, but also by sinus and tonsillar diseases.[1]

Foci of infection in teeth can cause such eye conditions as conjunctivitis, uveitis, corneal ulcers, central artery thrombosis, acute and chronic glaucoma, as well as various types of visual disturbances.

Parsons[2] has found that lamellar cataract is as a rule accompanied by defective enamel in certain types of teeth. It has also been discovered that the hypoplasia varies somewhat in the actual state of the teeth in congenital syphilis. It was noted that the teeth have transverse lines, and the cuspids and incisors are eroded. It has been demonstrated that there is a close association between the particular tooth affected and the average diameter of the opacity, and that malnutrition generally begins at birth. Different authors contend that the cause of the state of malnutrition can be linked with indiscretions in diet; there is, also, some likelihood of such diseases as rickets and congenital syphilis being present, although no absolute background is given for such theories.

Libby[3] reports a case of paresis of the left external rectus muscle of the eye resulting from apical abscesses in three teeth. Recovery followed extraction. All other reactions were negative.

In children, because of the soft alveolar process, metastatic inflammatory foci are rare, and the occurrence of apical abscesses are more common in adults than in children.

Back[4] studied the material of Elschnig's Clinic with regard to the rôle of teeth in the etiology of chronic iridocyclitis, especially, granulomas. He thinks that iridocyclitis is not propagated from the tooth by the veins, but may be caused by a gradual toxic influence from the teeth directly or through the blood stream. In Back's opinion, focal infection plays a part in iridocyclitis, herpes cornea, and retrobulbar neuritis, but is overrated by American authors.

The importance of focal infection in the etiology of iridocyclitis is stressed by Elschnig. In twelve out of twenty-nine cases of iridocyclitis, pyorrhea and apical abscesses were the only etiologic elements discovered, and in eleven cases in which indican was found in the urine, there was also positive dental involvement.

Bulson[5] analyzed one hundred consecutive cases of iritis, especially with regard to etiology and treatment. One third of this group were of syphilitic origin. In a few cases negative reactions to the Wassermann test were changed to pronounced positive after an intravenous dose of provocative neoarsphenamine was administered. About one third of the infections of the uveal tract were attributed to doubtful infected teeth; only four of these thirty-three patients were under 42 years of age.

Carbone[6] reports a case of neuroparalytic keratitis which was relieved only when a carious tooth was removed.

Langdon[7] reported several cases of infection of the uveal tract caused by focal infection from the nasal sinuses and teeth. Many cases of this type were also reported by Morgan[8], Ezell[9], Scarsborough[10], Smith[11], and Greenwood[12].

De Schweinitz[13], in a paper read before the French Society of Ophthalmology, stated that several types of micro-organisms might be responsible for an ocular infection from a distant focus, but in certain cases there may be a definite relationship between a particular organism and a particular type of lesion; for example, *Streptococcus viridans* of dental infection and iritis.

Van der Hoeve[14] reports that the state of the eye is an important factor in determining the necessity for removal of doubtful infected teeth.

[1]Kafka, M. M.: The Relationship of Sinus Disease to Diseases of the Eye, Larynogoscope, 47:272 (April) 1937.

[2]Parsons, J. H.: Diseases of the Eye, New York, The MacMillan Company, 1930.

[3]Libby, G. Q.: Paresis of Left External Rectus, Am. J. Ophth. 9:383, 1926.

[4]Zimmerman, Charles: The Uveal Tract, The Ophthalmic Year Book, 22:102, 1926.

[5]Bulson, A. E.: Etiology and Treatment of Endogenous Iritis, Tr. Am. Ophth. Soc. 85:327, 1925.

[6]Carbone, G.: Neuroparalytic Keratitis and Dental Caries, Soc. Ital. di Oft. 1924, page 168.

[7]Langdon, H. M.: Irideremia, Am. J. Ophth. 7:791, 1924.

[8]Morgan, J. A.: Monocular Iritis from Focal Infection, Am. J. Ophth. 7:459, 1924.

[9]Ezell, H.: Lesions of Uveal Tract and Diseases of Nasal Accessory Sinuses, J. Tennessee State Med. Assn. 16:397, 1924.

[10]Scarsborough, W. W.: Focal Infection in Relation to Abnormalities of Vision, Southwest Med. J. 7:411, 1923.

[11]Smith, S.: Focal Infection and Inflammation of the Eye, Atlantic Med. J. 27:166, 1923.

[12]Greenwood, A.: Metastatic Choroiditis from Focal Infection, Tr. Am. Ophth. Soc. 21:230, 1923.

[13]de Schweinitz, G. C.: Ocular Manifestations of Focal Infection Exclusive of Those Usually Attributed to This Factor, Proc. Soc. Franc. d'Ocul. 161:450, 1924.

[14]Van der Hoeve, J.: Eye Diseases in Tuberculosis of Brain and in Recklinghausen's Diseases, Tr. Ophth. Soc. United Kingdom, 43:534, 1923. Relationship of Dental Sepsis to Disease of the Eye, ibid., page 450.

He emphasizes the fact that in the event of a seriously endangered eye as related to infection, there should be no hesitancy to remove a doubtful tooth. This should be done as a precautionary measure. The infected tooth should be extracted to avoid the possibility of aggravating the existing condition.

Summary

1. At least 250 cases among several thousand revealed dental focal infection. In cases of infected eyes, examination of the patient should include a thorough dental study.

2. Infected teeth should be removed in existing eye infections, after necessary laboratory tests have been checked.

3. Doubtful teeth, which might aggravate an existing eye infection, should be removed without any hesitation.

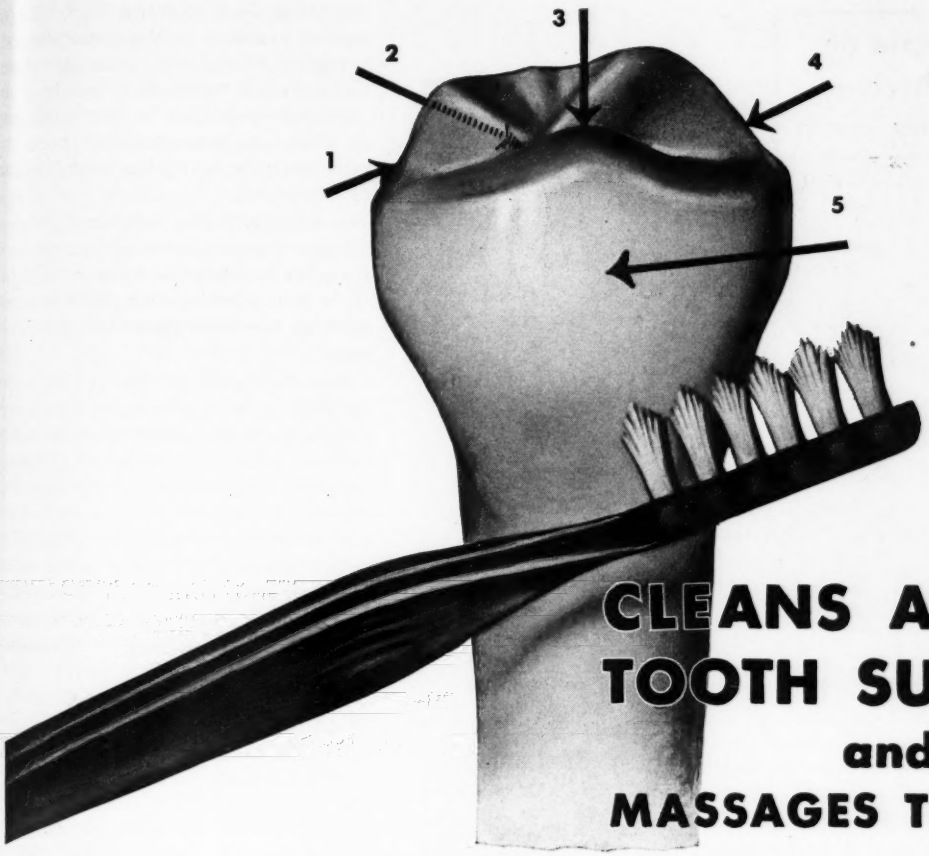
4. When a negative report is made by the otorhinolaryngologic department a careful study should be made of the teeth and dental roentgenograms should be taken to confirm the diagnosis. No examination of the body is complete unless a thorough dental examination is made.

5. A thorough medical examination should likewise be included in all cases of eye disorders.

807 *St. Marks Avenue.*

NOTES ON THE *Cuff*

Nov. 21—Museums can be a deadly bore. Not so the Oriental Institute of the University of Chicago. Children studying ancient history drag their fathers there; then, must drag them away. That happened to me. Dentists would be interested in the detail and design of bronze castings made fifteen centuries before the birth of Christ. These castings are as fine and as sharp as many we make in dental art today. These Egyptians hewed figures weighing as much as 40 tons of solid granite. The Egyptians worked in glass; they used color; they had papyrus to write upon with colored



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ink. Despite this technology, there was no evidence in the mummies of dental restorations, although the teeth were intact after twenty-five centuries. Contrary to the opinions of some paleopathologists, there is evidence of dental disease in the skulls of this period.

Anglers would be interested in observing that the fishhook has shown no marked change in form or design since some Egyptian dangled a bronze hook in the Nile 250 hundred years ago.

Nov. 23—Some of the health columnists are warning their readers of the dangers of springing from bed too quickly in the morning. (That has never been my trouble.) They suggest that we stretch and yawn a bit to get the circulatory mechanism adjusted before jumping out of bed. Wald and his associates, writing in the *American Heart Journal*, show that there is a fall of the systolic blood pressure of from 5 mm. to 40 mm. of mercury on changing from the recumbent to the upright position.

Howard Miller and Carroll Stuart of Chicago in their careful studies on the influence of local anesthetics on the circulatory mechanism showed that the syncope occasionally following injection could be largely prevented by injecting the solution slowly and by keeping the patient in a recumbent position for two or three minutes during and after injection. Even leaning over to empty the mouth immediately after the injection can cause a sudden drop of the blood pressure—enough to cause fainting.

Nov. 24—Responses are invited to a letter received from a non-dentist reader: "The problem of the modern dentist whose patients are being frightened away by the knowledge that metal fillings are a threat to health is solved, perhaps, by modern bone surgery. Would it not be practical to make tooth grafts (instead of fillings) using boiled beef bone? Even the enamel of the animal's teeth or of human teeth which have been extracted might, with proper technique, be made to amalgamate with live bone tissue. In cases where enamel has not developed properly this points a way to marked improvement. Kindly let me know if experiments are being made along these lines. With honest concern for progress in dentistry."

Nov. 29—Why is it that the American Dental Association was not one

of the hundred or more national associations taking part in the Conference on Educational Broadcasting that opened this day? The American Medical, Hospital, Nurses, Social Hygiene, and Public Health Associations were represented. The conference was called to examine the resources of education through radio. Is the dental health story important; has it educational possibilities? What are we doing about it?

Dec. 1—We are likely to believe that American dentistry has no comparisons in the world. In *Revista Odontologica* (Buenos Aires) Centeno presents an excellent article on oral surgery with a bibliography of 111 titles, only seven of which are by American authors.

Dec. 3—Before the Social Security Act there were 12 dental units in state health departments. In five years the number has increased to 32. And we don't want socialized dentistry!

Dec. 7—Arthur Davenport Black, 67, the eminent son of G. V. Black, died this day in Chicago, of leukemia.

Dec. 8—From near and far proud alumni of the University of Illinois, College of Dentistry, came to dedicate their new $1,500,000 fourteen story building. On the site where once the Chicago Cubs played on the west side of the city, where later the military preparations of soldier-students sounded—there this grand new building rises in the heart of the medical center.

The building has been planned for quiet scholarship. Faculty members and students are assured a privacy in this building unlike that found in any other dental college. Gone is the noisy infirmary of a hundred or more chairs where neither patient nor operator enjoyed a moment of privacy. In this new building the personal relationship between patient and operator can be professionally developed to its fullest inasmuch as each student operates in an unhurried, separate unit.

Modern sound-absorbing ceilings and adequate floor coverings aid in the conquest of noise. The science laboratories are designed to encourage students to return to them to conduct inquiries and research; they are not noisome, foreboding rooms to which students are sentenced before they may proceed to clinical subjects.

Under the able administration of Dean Frederick Bogue Noyes there is

no danger that this College will be deflected from its plane of high scholarship. Noyes' roots go back to Johns Hopkins University where he learned that men and teachers make colleges, not stone and mortar and steel.

Dec. 10—Abed with acute coryza the first in many years. How submicroscopic, filter-escaping forms of life can coldly walk up and down one's spine, and run from one's nose, and creak in one's joints is a biologic mystery of the first magnitude.

Dec. 11—Enjoying the luxury of a forty-eight hour beard and many books. Warm and damp from the press comes Netta Wilson's "Alfred Owre. Dentistry's Militant Educator" (University of Minnesota Press, $4.00). Read at one long sitting with satisfaction. This book is a fine example of how a significant biography should be written. The facts and funds to assure publication were collected by Owre's dental colleagues of his Minnesota days; the documentary material was gathered by the superintendent of the Minnesota Historical Society; the actual writing was done by a professional writer. The result is an understanding, objective account, without eulogy or posthumous vindications. Owre's ideals and friends, his battles and enemies are treated with fine restraint.

Dec. 17—Clarence A. Mills of the Department of Experimental Medicine, University of Cincinnati (*Journal of Dental Research,* **16:417** [October] 1937) took the results of the study made by the United States Public Health Service and the American Dental Association among more than one million children and analyzed them for significant trends regarding the incidence of dental caries. He concluded that in the United States the further north a child lived, the more likely he was to have dental caries; that the child who lived near the head-waters of a river could be expected to have less caries than the one who lived near the mouth of the stream; that the harder the drinking water in a community, the better so far as dentition is concerned; that the more salt one took with his food, the worse so far as caries was concerned.

There seems to be a conflict between the observation regarding latitude and the course of the river in the United States which Mills does not clarify. A child in New Orleans should